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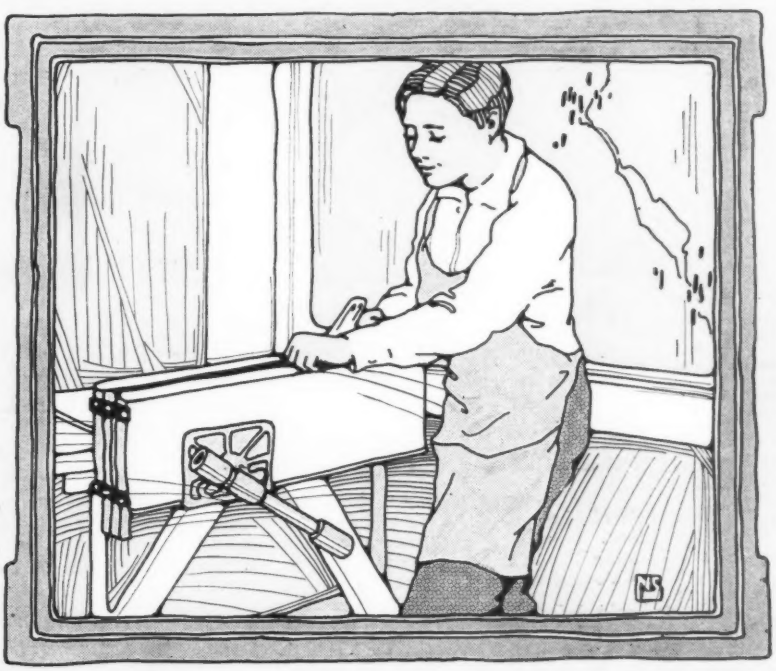

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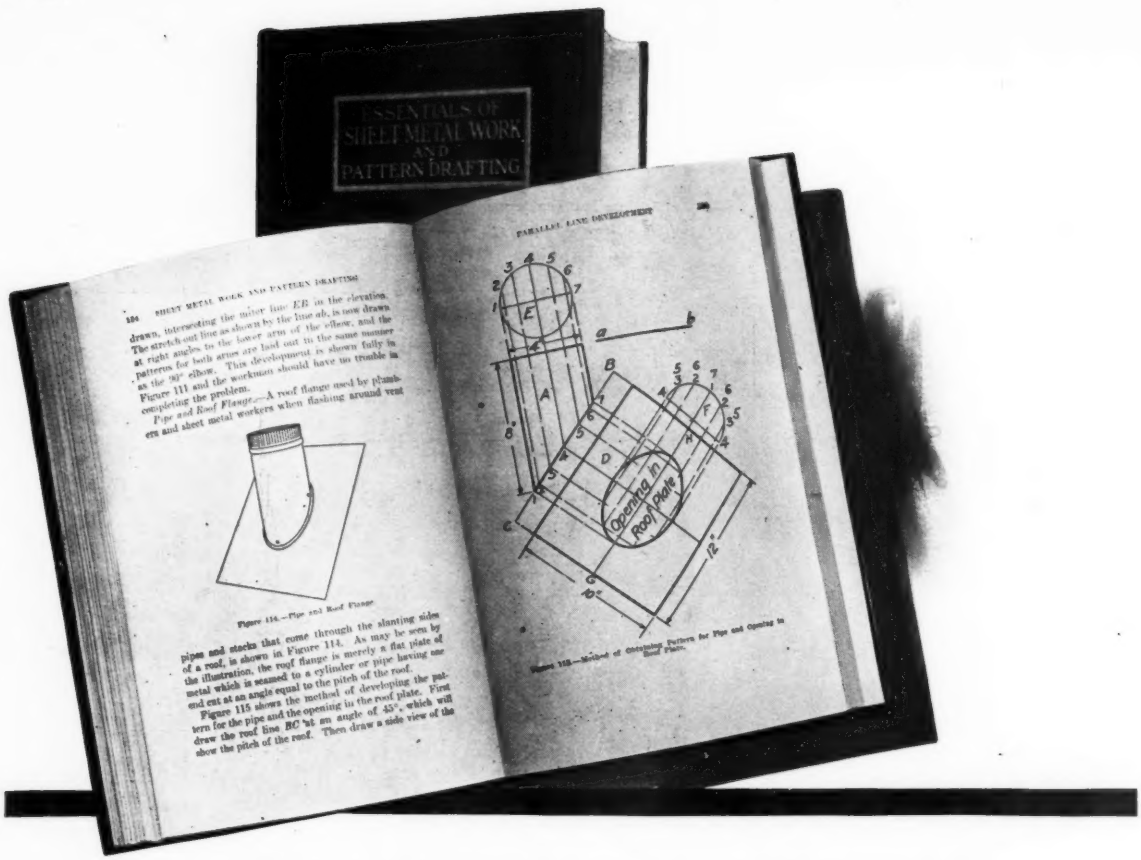

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INDUSTRIAL-ARTS MAGAZINE

Volume X AUGUST, 1921 Number 8

Pioneering in Manual Arts Teaching in China

F. A. Foster

THE awakening of China, dating from the abolition of the old literary examination system, in 1905, has stimulated a wide-spread desire for more and better education along lines which will help in the economic development of the human and material resources of the country. To this end technical, industrial and trade schools are being established and, in spite of the old prejudice against a scholar getting his hands soiled with labor, these schools are rapidly gaining in popularity. These efforts are divided between various private Chinese schools, the government schools and those established by the several missionary bodies. These efforts are, however, not well coordinated, as yet, nor as well financed as in America.

The recognition of the value of manual-arts schools is evinced by several normal schools which specialize in preparing teachers for this kind of work. This is a good beginning as it is the foundation work for spreading such instruction as will gradually enable them to expand to a nation-wide system in the course of another generation. As is to be expected in a country undergoing such great changes as China at the present time, the matter of education is not receiving as much support from the government as it ought. Then, too, there are old time prejudices to be overcome and a clearer vision to be developed, which take time and constant effort on the part of those who have come to realize the true value of such work. In some of the schools that have been started there is an evident lack of vision as to the scope and importance of this, to them, new departure in education, but this is not to be wondered at, for they have no past experience on which to base their efforts. It will be some years yet before they are well established.

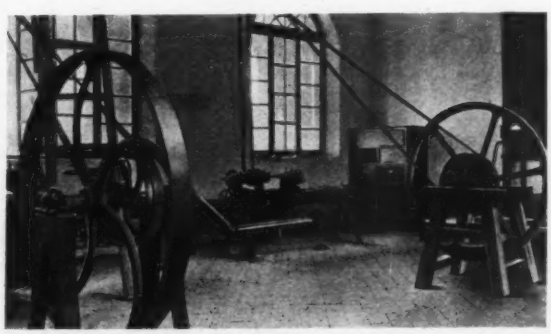


FIG. 1. YU TE MIDDLE SCHOOL MACHINE SHOP WITH HAND-DRIVEN LATHES IN 1916.

FIG. 2. STUDENTS OF YU TE SCHOOL AT MOLDING.

A more or less successful effort has been made to get the teachers and others interested in this work, organized so as to increase the efficiency of the work by cooperation, but there remains much to be desired in this direction. The introduction of the best foreign experience is greatly needed but it should be applied with proper consideration for the conditions here which are different from those in America and Europe. This involves either the education of a large class of young men and women of recognized ability for this kind of work, or the introduction of numerous foreign teachers, or both.

The National Association of Vocational Education in China.

One of the most notable efforts for promotion of this type of education is that of "The National Association of Vocational Education of China." This Association was initiated by Doctors P. W. Kuo, Huang Yen-pei and other progressive educators in the spring of 1917. As a result of their efforts a wide-spread interest was developed by lectures, lantern slides and industrial investigations, carried on not only in the north but also in the south and even into foreign countries where

FIG. 3. PRACTICAL FOUNDRY WORK AT YU TE SCHOOL.

there were populous Chinese settlements, as in Singapore, Penang, the Malay Peninsula, Java and Sumatra. Besides this work there has been considerable done by publishing a monthly magazine and some books in the Chinese language, on vocational education, elementary woodwork, a teachers' guide to vocational training in primary schools, etc. The association has an enrollment of 2,298 ordinary, 328 sustaining and 130 life members who are scattered in different provinces and also among the oversea Chinese.

The Chung Hua (Chinese) Vocational School.

For the purpose of making experimental work available to the members of the association and setting up a model for the reference of people interested in vocational education in the Republic of China, the Chung Hua Vocational School was opened at Shanghai in the spring of 1918. As a result of investigations made in the district in which the school was located it was found that the residents were mostly engaged in the trades of the woodworker and blacksmith. To meet the demand of the locality, courses in woodwork and ironwork were first established, in the fall of 1918. Later it was found that enameling and button making were simple in art but good in profit, so in addition, these two courses were added as an incentive to new trade among the people.

In these four courses enrollment is open to graduates from high primary schools in which they are to be educated for three years. There are workshops in the school where the pupils work half a day, spending the other half in the classroom. The school also admits apprentices and trains them to be workmen.

In the fall of 1919 a training course for teachers in vocational education was offered to graduates of middle schools (The middle school corresponds practically to the high school in America) for a period of a year, during which they should apply themselves to shopwork. This was done because the vocational schools which had been organized in various localities, after the model of the Chung Hua Vocational School were lacking in teachers. Later arrangements were made with La Societe Franco-Chenoise d'Education to open a preparatory course in the school for one year, receiving the middle school graduates who are prepared to go to France to study. They are being taught French and shopwork in the school.

A notable feature of this vocational school is that the disciplinary work of the school is left to the students themselves in the form of self-government. Anything that can be controlled by the students is not interfered with. This has a very salutary influence in building up initiative and self reliance so much needed by such students.

FIG. 4. YU TE MIDDLE SCHOOL, CLASS IN WOODWORK AND PATTERNMAKING. NOTE CRUDE BORING APPARATUS AT EXTREME LEFT.

The amount of money put into building and equipment for the school since its opening exceeds $50,000 and the running expenses are about $26,000 annually. The increasing number of students from different places wishing to enter the school, and the orders from factories for the manufacture of different goods have caused no little congestion in the school. The work of extension is now under consideration.

Since the opening of this school, many other schools of the same type have been planned in Soochow, Wuhu, Nantung, Swatow, in various places in Szechuan Province and elsewhere. Some of these schools have already started while others are under preparation. The Cotton Mill Association, in Shanghai, is also fostering the idea of opening a school covering the cotton and iron industries.

The English Language in Chinese Schools.

Instruction in scientific, technical and industrial subjects in the Chinese language is greatly hampered by the lack of a uniform system of accurate terms and expressions applicable to such subjects. The past life and education of the people has been such that there has been no call for them. In the past, provincialism has been a notable characteristic of the people. The language which varies greatly in the different provinces, makes it difficult to secure uniformity. In preparing books on subjects of a scientific or technical nature, it is desirable that the expressions used shall be uniform and convey the same meaning in all places. These conditions have combined to bring in the use of the English language in the higher schools. This has largely been helped by the missionaries, a large majority of whom use that language in the mission schools in the more advanced studies. At present the English language is studied in a great many of the middle schools, much as French or German or Latin is studied in our high schools in America. It is no uncommon experience at some of the higher Chinese schools to hear two students from different provinces using the English language instead of the Chinese, in order to make themselves understood. In the higher institutions like Pei Yang University, in Tientsin, Tsing Hua College, in Peking and

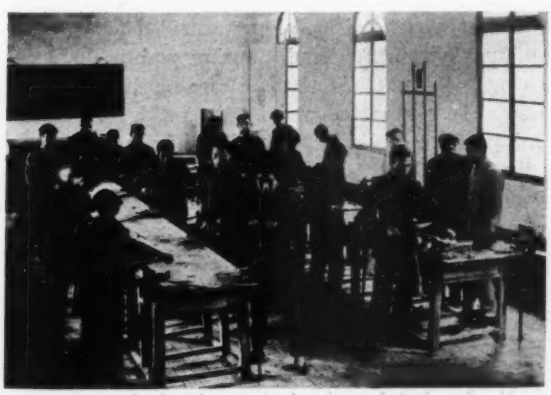


FIG. 5. METAL BENCH WORK IN YU TE SCHOOL. Student in middle foreground is using a "pump" drill.

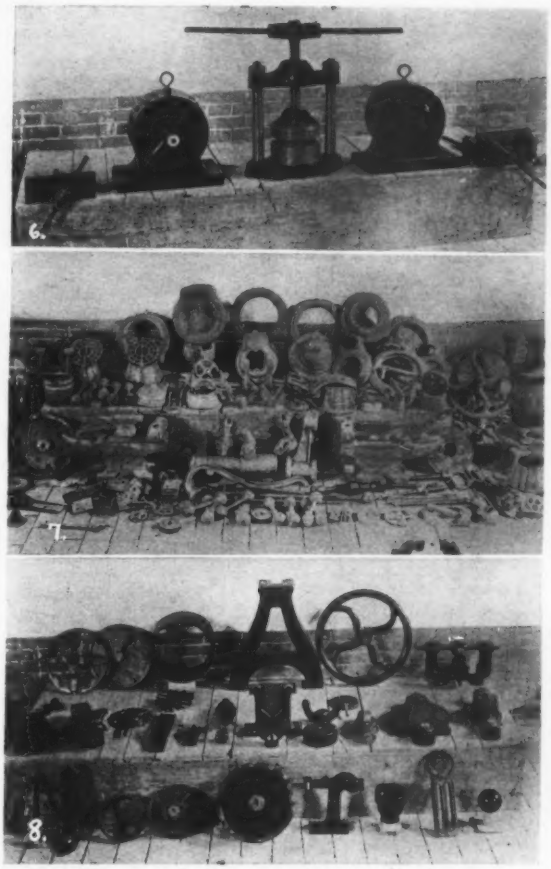


FIG. 6. VISES, MOTORS AND PRESS MADE IN YU TE SCHOOL. FIGS. 7 AND 8. CASTINGS AND PATTERNS MADE IN YU TE SCHOOL.

Tangshan Engineering College, Tangshan, a large part of the instruction is given in the English language.

A number of committees, composed of foreigners and Chinese who have been educated abroad, are engaged in the difficult task of systematizing and unifying Chinese scientific terms which will, it is hoped, be adopted throughout the country. Already substantial progress has been made. The recent adoption of an alphabetic system may have far reaching influence in simplifying the language difficulty by greatly reducing the work of learning to read and write. The difficulty of learning the old idiograph characters has stood in the way of many of the people learning to read. The new system is so much simpler that it will place books and the ability to read them within the reach of nearly everybody. Another generation should see a great change in these matters.

The Yu Te Middle School, at Paotingfu.

A quite notable effort at introduction of industrial education is that of the Yu Te (pronounced Ye Deh) Middle school, at Paotingfu (pronounced Boughding-foo), in Chihli (pronounced Jer-lee) Province. This is a private school with, at present, about 450 students, of which about sixty take the industrial course annually.

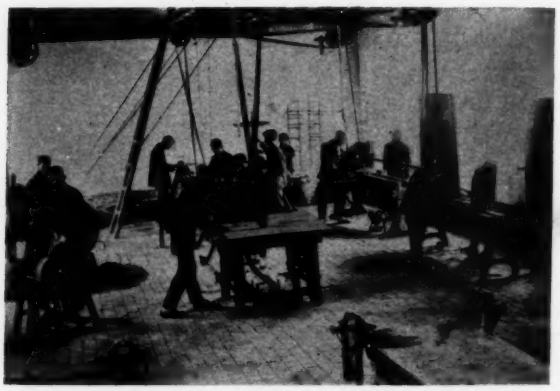


FIG. 9. MACHINE SHOP OF YU TE SCHOOL IN 1919 WITH OIL ENGINE AND NEWER MACHINERY.

Starting from very humble beginnings about fifteen years ago, they have built up a very enviable reputation for thorough and efficient work. Although their equipment is not as extensive as some other schools, the spirit with which the work is carried on makes the work done there of considerable importance in its potential effect on the field of industrial development.

The first work undertaken in the shops of this school was entirely in the line of woodworking. About four years ago they came into possession of two old Japanese lathes, copies of some ancient European type and they started on a metal-working course. As they had no engine to drive these lathes, they were compelled to rely on the usual Chinese source of power, viz., hand power. Fig. 1 shows their machine room as it appeared at that time. The lathes are driven by turning the cranks of the two countershafts set up on stands on the floor.

The following year they were presented with a five-horse-power oil engine from America which they installed in a new shop. With this addition they were able to start foundry work by using the power for a rotary fan for the blast for the cupola. Figs. 2 and 3 show the students engaged on foundry work. The cupola is the usual Chinese type of a very short stack mounted on a collecting basin which is mounted on trunions. The iron is taken off as it accumulates in the basin by tipping the whole stack by means of a handle at the back.

Through the generosity of some members of the National Machine Tool Builders' Association, they have now acquired a Steptoe shaper, a Seneca Falls Mfg. Co.'s lathe, a Mueller Machine Tool Co.'s tool room lathe. Several other machines have been promised which have not yet arrived. The most recent gift to this school has been that of a fifteen H.P., throttle controlled "Novo" oil engine contributed by the makers. Figs. 4 and 5 show bench work in wood and metal and Figs. 6, 7, 8, show products of the shop. Great effort is made to have the product commercially practical and profitable. The products shown are all such as would bring credit to any school in America. In addition to the equipment acquired from outside, the students have made a turning lathe and a circular saw and this year have been concentrating their efforts on making improved equipment for irrigation purposes. A great deal of irrigation is done from wells by the farmers in that part of China, hence the efforts of the students to try and improve such conditions, stimulated, no doubt, by the recent severe drought which has caused the present great famine in North China. Fig. 9 shows the machine room as it appeared in 1919, with the oil engine installed.

At two other schools in Paotingfu they have inaugurated manual arts instruction, viz., the Chihli Provincial Technical School and the Chihli Higher Normal College. At the former the major course is along textile lines with minor courses in woodwork and metalwork. At the Chihli Higher Normal College they have attempted to train teachers for manual-arts work. It was with this school that the writer accepted a contract in the fall of 1915, when the work was inaugurated, with a class of 44. The equipment of the school was practically nil, but an appropriation of a few hundred dollars was granted with which to get some tools from America.

War conditions prevented the arrival of these tools for many months and work had to be carried on as best it could be until their arrival. This waiting time was occupied with such work as could be done without them or with such as could be made to meet the occasion, such as paper work, clay modeling, drawing, etc. Excellent clay modeling tools were made from bamboo with the aid of knives and rasps. The Chinese use locally-made rasps a great deal for finishing wood. They have a form of knife that is well adapted to paper cutting. See Fig. 10.

FIG. 10 Chinese Paper Cutting Knife

The course in paper work included various cutting and folding exercises, followed by cardboard work. Fig. 11 shows some of the original in cardboard work of the class. As geometrical models were needed for the elementary work in freehand drawing and perspective, such models were made of white cardboard by the students. These were followed by the making of model furniture from cardboard, following the course laid out by the Misses Lathe and Szold. Although it is not always considered good policy to make models, under the circumstances, this proved to be very satisfactory and gave excellent training in constructive ability and initiative. As most of these teachers were to have their work in schools not over that of our grammar schools, this work was specially applicable.

Drawing at the Chihli Higher Normal College.

Freehand and mechanical drawing had been on the curriculum of this school for a number of years but the

instruction consisted in mere copying. Few principles were taught. The Chinese idea of perspective is about like isometric drawing, having no convergence. It was no easy matter to get students to learn and then apply the principles of perspective. After a good drilling in perspective with the geometric models made in the paper course, they were sent out to try the principles on buildings and general outdoor work, instead of copying from drawings and pictures, as had been the custom under the old system. This had a very beneficial effect

The college also purchased a lithograph press and employed a skilled lithographer who took the drawings prepared by the teachers and reproduced them on the stone for the textbooks. The press proved a most valuable adjunct to the work of the school. Besides the drawings for illustrating the manual arts course the other teachers used it for their work with excellent effect. An American teacher was employed as instructor in a normal department of athletics. He found lithography a most useful adjunct in illustrating his subject.

FIG. 11. ORIGINAL PAPER PROJECTS BY STUDENTS OF THE MANUAL ARTS DEPT., CHIHLI HIGHER NORMAL COLLEGE, POATINGFU, CHIHLI, CHINA.

on their work, although occasionally a sketch came in drawn as the object would look from some imaginary point up in the air. A favorite object for sketching was the Martyrs' Memorial, a beautiful stone structure erected, by the Chinese, to the memory of the Christian missionaries of Paotingfu, who were killed in the terrible Boxer Uprising of 1900.

In mechanical drawing, emphasis was laid on the principles of orthographic projection with numerous practical applications. A large glass projection box was made and constantly used, greatly helping to visualize the problems. Both first and third angle projection were taught and they were given problems involving one or the other at random so as to enable them to easily discriminate between the two systems. Metalwork brought in many practical applications of mechanical drawing.

Textbooks by Lithography.

Textbooks on all manual arts subjects, in Chinese, are few and not up to the standard of the best American books. To meet the situation it became necessary to make such textbooks as were wanted as the class needed them. The classes at the Chihli Higher Normal College, contrary to usual present day conditions, were not prepared to take instruction in the English language. It became necessary, therefore, to prepare books in Chinese for their use. Selecting the best features of the best American courses, instruction sheets were prepared in English and given to interpreters who were graduates of the college's English course, who put them into Chinese, written on stencil sheets, from which copies were printed by mimeograph and given to each student. In the first class the English sheets were also mimeographed so that those who had some knowledge of English could compare the two. These notes were printed on strong, thin brown paper and bound with brass binders.

The medical department found it invaluable in the teaching of anatomy. Besides the regular illustrative work of the text, notes, etc., squared paper, isometric projection sheets, music and form sheets of many kinds were made.

In the orthographic projection and descriptive geometry work of the second class, the problems were stated in writing and the students made the drawings on standard-sized sheets of paper printed with light green lines forming one-sixteenth inch squares. Occasionally a few preliminary lines were given from which to work, but the main object sought by this method, in both classes, was to avoid the tendency to copy the solution of the problem if it is presented to the student in the form of a drawing, as in many textbooks. The tendency to copy, by the way, has to be reckoned with in the case of Chinese students. The old system seemed to foster that method, greatly to the detriment of the spirit of initiative and originality. This probably had its origin in the cult of ancestor worship which generated a sentiment that nothing can be better than the ancestors produced or had.

FIG. 12. FURNITURE MADE BY A CLASS OF MANUAL ARTS STUDENTS, CHIHLI, HIGHER NORMAL COLLEGE, PAOTINGFU.

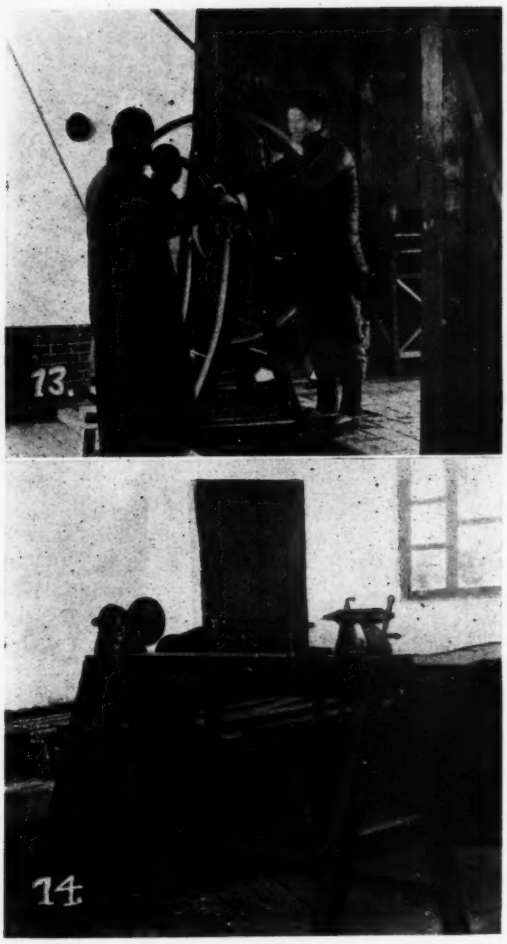


FIG. 13. "FOUR-MAN-POWER ENGINE" FOR DRIVING TWO LATHES, A PLANING MACHINE AND A DRILL PRESS, AT THE CHIHLE HIGHER NORMAL COLLEGE, PAOTINGFU.

FIG. 14. TURNING LATHE MADE BY THE STUDENTS OF THE YU TE MIDDLE SCHOOL AND THE CHIHLI HIGHER NORMAL COLLEGE, PAOTINGFU.

Shop Practice at the Chihli Higher Normal College.

After the arrival of the tools from America and the preliminary exercises in handling them, needing more tools of other kinds not obtained, the class was given exercise in making their own tools, such as squares, bevels, marking gages, planes, straightedges, shrink rules, etc. These also helped in developing the needed initiative and self reliance which are needed so much in the work of these young men who will have to do pioneer work in new fields and where the equipment will be inadequate.

These exercises were followed by cabinet work and furniture. Some of the larger pieces are shown in Fig. 12. The class was divided into nine divisions and each division was given a small general sketch of a piece of furniture which each student of the division drew to as large a scale as practicable and then made detail drawings of each part. Care was taken to show them how to design good joints etc., so that they could design each part understandingly. Thus each student got a good idea of each piece before beginning to make it in the shop.

The lithograph department was a great help in this work. One student in each division made drawings of the pieces for his division and had them lithographed for the whole class. In this way all the class had full sets of drawings of all the exercises. Often the students would take a hand with the lithographer and help put the drawing on the stone thus getting practical experience in lithograph printing as well.

The College did not contemplate including metalwork which requires machinery when the course was started, that being a line with which they were unfamiliar and the value of which they were unaware. After repeated efforts to convince them of the need of machinery, consent was obtained to give machine work a trial. At that time the world war conditions were not favorable for securing machinery from abroad, so the experiment was tried of using machine tools made by Chinese workmen. Two lathes, a planer and a sensitive drill were bought from a shop in Peking where they were made. As the shop had no patterns of a planer of suitable size for the school and there was no time for making a set of drawings, a picture was cut from an advertisement in a mechanical paper and the dimensions specified for the capacity. These were given to the manufacturer and he made the patterns and machine. The workmanship on all these machines was very poor,—in fact, if they had come into an American shop they would have gone directly to the scrap heap. Almost more time was spent in repairing them than in doing the regular work. The lathes were modeled after old European types of tools. As a step bearing for the spindle of the larger of the two lathes, the maker had made an attempt at modernity by installing a ball bearing, using a *tin retainer.*

Permission to purchase an engine for driving these machines could not be obtained, so it became necessary to resort to the Chinese expedient of a hand drive. Fig. 13 shows the "four man-power" engine. This drive, in fact was one that was discarded by the Yu Te Middle School. About one-tenth of a horse-power can be developed by a man for continuous work, provided he does honest work. Such a source of power greatly limits the cuts that can be taken and the amount of work that can be turned out. Fig. 13 shows a corner in the machine room of the Chihli Higher Normal College, at Paotingfu.

The advent of these machines opened an almost undreamed of field of work for the students, most of whom had never seen such machines before. The sight of one piece of steel cutting another was a surprising novelty to them, and set them to thinking along new lines. These machines, which, to Americans, would seem only fit for the scrap heap, seemed wonders to these students. What a revelation to them would be a good American lathe and upright drill set up beside these cruder Chinese attempts at such work! Here is a great oppor-

FIG. 15. CLASS OF SIXTY MANUAL ARTS STUDENTS AT CHIHLI HIGHER NORMAL COLLEGE, PAOTINGFU, CHINA.

tunity for the American manufacturers of machine tools if they would only seize it at this stage of the development of industrial preparation. The recent introduction of some new American tools by the Yu Te Middle School and the Government Technical School, at Paotingfu, has given some of these students a chance to make this comparison.

The introduction of metalworking tools and machines opened the way for pattern making. As woodturning was needed for some of this work, drawings were made by the students of a large foot-power turning lathe. This project also involved some pattern making. Each student made a full set of drawings and most of the patterns of the lathe, thus putting themselves in position for making similar lathes when they get schools of their own. In the design of this lathe it was sought to have as little machine work as possible, so as to meet the probable conditions they would have to contend with. The headstock and other bearings were of babbitt metal and the bed and legs of ash. To give as high speed as possible, a countershaft was made a part of the lathe, enabling a possible drive from a main shaft when available. See Fig. 14.

With the lathes, planer and drill available, they were enabled to make iron body planes and each student of the first class had such a plane completed before graduation and was permitted to take it away with him as a seed for further development of the use of modern and more efficient tools. They also were permitted to take away all the other tools which they made.

The introduction of the metalworking course has opened several new avenues leading to the industrial development of the country. They have learned to make a better equipment of tools than is usual in China and learned how to use them. It has given them a new and better outlook on new work. They have been taught to try and improve the old ways and tools and have acquired a feeling of self reliance that the old methods of teaching did not give. Instead of distrusting new and untried methods they now welcome them. This gets well down to the foundation of the economic regeneration of old China and it is the basis for development of the new republic, on which it must be built. As an evidence of their appreciation of new tools made available to them, this class, just before graduation, sent for several hundred dollars' worth of American tools which they needed for their personal use in their new field of work as teachers of manual arts. They will form new centers of activity and development in the localities where they will be placed in the government's work of establishing manual arts training. Their mental and material equipment may not be quite up to that of the average American teacher starting out on such a career, but it will be a long way ahead of the standards of the past in China. It augurs well for China that such work is being so well encouraged and the present growth is very encouraging.

An elementary course in building construction was given this class so as to enable them to undertake the design and construction of new and better schoolhouses and workshops in their new field of work.

The first class at the Chihli Higher Normal College was given a four-year course and another class was not expected to start until that had finished its work. At the end of two years, however, the Provincial Board of Education organized another class of 119 members to take a two-year course. These were selected by competitive examination of teachers who had had one or two years teaching experience. One from each county was chosen. They were to take up work in primary schools in their respective counties. When this class was wished on the college by the board of education, no preparation had been made for them. An addition had to be hurriedly built onto the workshop to accommodate them. Benches, vises and necessary tools had to be made. Even beds had to be made for them. Drawing instruments of good foreign make for so large a class were not to be had inside of six months, so almost worthless ones of oriental make were bought. At the same time a man had to be employed to keep these drawing tools in repair, they were so poorly made. All workshop tools for the first class were furnished by the college, but the new class was required to pay for many of the tools used. Wooden planes, squares, marking

gages, etc., were made by a carpenter hired by the college. All this caused a delay in getting down to work in the shop for several months.

In addition to this burden, the class could be divided into only two divisions, one of 60 and one of 59. No assistant was allowed and the work had to be carried on through interpreters who had had no experience in manual-arts work. Two interpreters were furnished for this class, one for each division. The first class was supplied with three interpreters a part of the time, each taking a different subject, in which he had to be taught before he could take the work intelligently. This in itself was no small burden. Fig. 15 shows one of the divisions of the second class at shopwork, illustrating the crowded conditions.

This situation was not without its good features, as it gave several months in which to introduce the subject of projection and mechanical drawing, before actual work began in the shop. The students were thus enabled to make many drawings of their shop problems before beginning actual work on them in the shop. Previously it had been impossible to persuade the college authorities of the value of such a course.

(To be Concluded)

Cooperation of the Classroom and the Shop

Margaret Cunningham Ells, Head of Girls' Division, Continuation School, Springfield, Massachusetts

THE assignment sheet was sent from the shop to the classroom as explained in Mr. Twichell's article in the June number of the INDUSTRIAL ARTS MAGAZINE for the purpose of giving the specifications of the job, the kind of material to be used and all other necessary information for the carrying out of the project. Conferences between the shop instructor and the academic instructor were held frequently to determine the practical ways in which to relate up the work. Without such conferences, related work can never be carried out to any great extent by the academic teacher. The specification sheet given the boys to carry back to the classroom, and the one sent the teacher from the shop are valuable, only as they are properly interpreted. The shop teacher cannot carry out the related work alone, neither can the academic teacher do it without help from the shop. It is only by close cooperation between classroom and shop that this work will function. It is well for the academic instructor to visit the shop as often as possible to see the boys at work on the job. In this way much information can be secured that is invaluable.

After a discussion of specification sheets in the classroom, the job was divided into three elements for the purpose of securing costs when computed as follows:

1. **Material.**
   Wood—Southern Pine and Cypress.
   Sheet Metal—Tin Plate.
   Soldering necessary for the job.
   Nails and screws.
   Soap Stones or some substitute.
2. **Labor.**
3. **Overhead or Burden.**

The above scheme of dividing the project into material, labor and overhead gave the boys a skeleton upon which to build in every project, and brought out an innumerable amount of practical questions. For example, a boy doing repair work on bicycles at this time outlined to the class very definitely how he set out to figure the cost of a job. There was much discussion over what he should charge for parts furnished, and the right percentage to charge for overhead. Finally, the boy convinced the class that it was safer to charge a reasonable price and build up bicycle repair work on a fair profit scale. Many other practical questions came up in computing the cost of different jobs. Some of the boys quoted what their fathers thought, and many of them conferred with their father to find out just how a carpenter, painter or sheet metal worker computed costs of jobs. In connection with this work the shop instructor always gave very valuable directions and definite help. Before telling a boy that a sheet metal worker was getting 90 cents per hour, Mr. Twichell investigated conditions, and found out just how much sheet metal workers were receiving in our community at that time. Therefore, the boys had a very definite basis on which to build the cost of a commercial product.

After the general discussion of the project, the class was divided into two groups, the Junior two's doing the wood work, and the Junior three's doing the sheet metal work. As soon as the work had started in the shop, and the boys had received specification sheets and assignments of the different operations, the work was begun in the classroom, the materials to be used by the different groups, duties of the stock record clerk, time clerk, foreman of the job, and the individual worker's duties, were all taken up. The different operations involved, and the boys responsible for the different operations were also discussed.

English—Junior two and three.

In each division, sheet metal and woodwork, short descriptions were given of the individual operation or the duties in the shop. For example, the stock record clerk went before the class and gave a brief description of the project to be made, and outlined his duties in keeping stock records. In like manner, the time clerk, the foreman of the job and the other operators told just what their work consisted of, whether planing, squaring, assembling or whatever their work might be. The foreman of the job in his description brought out the care that should be taken not to waste or spoil materials, especially on account of the increased price of all materials necessary for this project. From these oral descriptions, we were able to secure some good written

descriptive paragraphs, which served as an English exercise. The project as a whole was thereby taken up as classwork, though each individual had his special work.

The material to be used by the Junior three's in making the containers for the fireless cookers was tin or tin plate as we learned later. At once we set about to find out where tin was found and by referring to handbooks and catalogs a very valuable industrial history and geography lesson was developed.

Industrial History and Geography—Junior Three.

We found by referring to a handbook gotten out by the American Sheet and Tin Plate Company that the process of coating iron with tin was invented about four hundred years ago, in the ore mountains of Saxony, where ores of both metals existed. The people in that country kept the process a secret for nearly a century, but after a long and diligent search, English manufacturers, toward the end of the seventeenth century, learned the secret. Later the English discovered the process of rolling iron sheets, and the tin plate industry grew rapidly and for nearly two centuries England maintained supremacy in this industry. In recent years, the United States has become the largest tin plate manufacturing country in the world. The manufacture Pennsylvania. Here the question came up why the of tin plate was first undertaken in 1873 in Ohio and manufacture of tin plate started in these states, and the boys immediately recognized the fact of the wealth of coal and iron ore underlying this section of the country. We were not successful in the manufacture of tin plate in this country at first, because the low duty imposed on foreign tin plate put us out of the market until the Tariff Act of 1890 doubled the duty on foreign tin plate. In this connection, an arithmetic lesson was worked out on customs and duties and tariffs on imported goods.

Other sources of tin were found to be the tin mines of Cornwall, England, and the adjacent islands. In ancient times they were called the "Tin Islands." By referring to the different reference books, the boys found that one thousand years before Christ the Phoenicians sailed from Tyre and Sidon across the Mediterranean Sea venturing as far as the "Tin Islands" and carried tin back to Phoenicia for use in the manufacture of bronze. The tin mines of Cornwall, England, are still being worked, and rank among the oldest in the world. By still further investigation we found that most of the tin used in the United States comes from the Malay Peninsula and the adjacent islands, also from New Zealand and the state of Bolivia in South America. Most of the tin used in the country comes from southeastern Asia and is known as "Straits Tin." Large smelting establishments are operated in Penang, Singapore and Banka.

We had learned from our previous study of iron ore to finished product, that when the crude ore had been fashioned through the different operations into sheet iron, sometimes the sheets were put through baths of sulphuric acid, then water, then muriatic acid, next through a tank of molten zinc, which, when cooled, was called galvanized steel or sheet iron. In like manner the sheet iron was treated and finally put through the bath of molten tin forming the tin plate used for our fireless cookers. Right here in our science work, many experiments were made with the different acids and their effects upon the different ores.

In working out our history and geography lessons, we made use of maps constantly, locating the different places from which tin came, a study of the people working in the tin mines and finally the routes over which the tin came from the Malay Peninsula, Bolivia or New Zealand until it finally reached Pittsburgh, Pennsylvania, the home of so many big smelting establishments. Outline maps of the world were used for this work, and very definite places were given the boys to locate. The question of the important iron mines in Lorraine which Germany had held since 1870 was discussed. From a magazine article one of the boys found that Germany got 21,000,000 tons of iron ore from Lorraine in 1913. Is it any wonder that Germany clung desperately to this vast supply of iron ore? Where does our best ore come from today? We found that the best ore in the world comes from our own state of Minnesota, and even a German from Essen admitted that even though they had furnaces as large as ours, our machinery, our skill and organization, coal as plentiful as ours, *yet they hadn't our ore.*

The next point brought out was the reason why we stand as the leading tin plate manufacturing country of the world. What is tin used for? The boys found by investigation that the food pack of the United States in 1917 required 8,000,000,000 tin cans of various sizes. The various makers of condensed milk used 3,000,000 cases, the salmon pack of the country required 350,000,000 cans, the corn pack used up 286,000,000. Other canned goods such as asparagus, peas, pork and beans, tomatoes, fruits of all kinds, molasses, sardines, etc., required billions of tin cans. The Standard Oil Company, used up still more billions of tons of tin plate, and finally taking the whole population of the globe into consideration, we learned that there was enough tin plate manufactured in this country to give more than three square feet of standing room for every man, woman and child on the face of the globe. None of these figures were committed to memory, but it was an eye-opener to the instructors as well as to the boys to find out how much tin plate was used by Americans.

Going into the history of the tin can we found that Napoleon offered a prize to a man who could invent a method of preserving food for his armies. A Frenchman, named Nicholas Appert, in 1814, conceived the idea of putting food in glass jars. His idea was good but glass was heavy and breakable, and did not lend itself to transportation and rough usage. His invention came too late to avert the tragic retreat from Moscow, and too near the final field of Waterloo to be a

factor in the results. There might have been a different ending to the imperial dreams of Napoleon, and possibly no opportunity for world conquest by Kaiser Wilhelm would have presented itself. The boys were very much alive in working this out and enumerated for the academic instructor the numberless varieties of canned goods which accompanied our army to France and kept it alive. No doubt the recent victory in our world war could not have been accomplished without the aid of the tin can in transporting food. The boys also traced out the work of Robert Peary to the north pole and the service that canned goods must have given him, as well as Lieut. Scott on his journey to the south pole.

The work of tin cans might go on in an endless manner, but a couple of good solid lessons were given on the vast use of tin plate, and we passed over to the composition of tin or tin plate which we found to be in most cases, 98 per cent steel and 2 per cent tin.

Hygiene—Junior Three.

Other uses for tin plate were found in ventilators and from this work a lesson in hygiene developed, showing the necessity for ventilation in all places of industry. Leaflets from the U. S. Government on how to "keep well" emphasized ventilation. Many state laws now require buildings to be so erected that each person will get 30 cubic feet of fresh air, containing 21 per cent oxygen a minute, or eighteen cubic feet per hour. The public now realizes that ventilation is not a luxury but a necessity. Impure air plays a very important part in occupational diseases and the evil effects of insufficient ventilation are especially alarming. By studying this subject of ventilation and referring to good authorities we found that statistics show lack of ventilation in schools is often the direct or indirect cause of tuberculosis. Gulick's health books and magazines as well as publications from the U. S. Public Health Service were used for reference in teaching this subject of ventilation. Emphasis was given to the state law of Massachusetts which states, that a fresh air supply of 30 cubic feet per person per minute is required. In many factories and other buildings tin plate ventilators are used, also galvanized sheet iron ventilators.

Oral and written compositions and reproductions on the subjects taught and discussed were given for classwork. In some cases the boys were asked to give definite sentences about the sources of tin, or sentences asking questions about tin, or whatever point needed to be emphasized for written work in English.

Arithmetic—Junior Three.

The arithmetic in connection with the work on tin plate was very practical. The tin plate came in packages of 52 sheets at a cost of $13. These figures were taken directly from the bill sent to our school. Problems such as finding the cost of one sheet of tin, twelve sheets of tin, etc., were given. The sheets were 20"x28", and we found the surface of one sheet of tin and the surface of various numbers of sheets. Much drill was given right here in necessary fundamentals of which there is always a lack. By going over our plans we estimated that one and one-half sheets of tin plate would be used for each cooker. Twenty-five cookers were to be made, therefore, we would use 37½ sheets of tin. The question came up wether or not we could buy one-half sheet of tin, and the boys decided that we would have to pay or charge 38 sheets to the job. Each sheet cost 25 cents, therefore, the value of tin used was $9.50. Much drill work and many similar problems and examples came out of this. Next came the shape of cover, the question of finding the surface of a circular base, and the cylindrical container, itself. Right here we taught, diameter, radius, circumference, area of circle, surface of cylinder and contents of cylinder. This was very valuable work. The boys worked directly from the circles which had been cut out, and from the cylindrical containers. They actually measured diameter, radius, circumference, etc., and tested their own work. Compasses were used constantly. In other classes a teacher might spend hours developing the surface of the cylinder, but here the cylindrical container was opened out and the boys saw at once that it was purely a rectangle. Instead of spending a great deal of time memorizing rules for area of circle, contents of cylinder, etc., the following handbooks were used for reference: Simond's Guide, American Sheet and Tin Plate Handbook, Millers-Falls tool catalog, Machinists' Handbook, also handbooks and catalogs from the Starrett Tool Company, Brown & Sharpe, Peck, Stow & Wilcox, and many other companies. The more common rules and approximations were learned in connection with this Project, but by investigation the boys found that most men in shops refer to handbooks or decimal equivalents as given on micrometers. Therefore, it seemed advisable to have the boys learn how to find needed rules and measurements.

The woods used for the cases of the fireless cookers was southern pine, also some cypress. Previous to this we had spent much time on the study of pine so a brief review of the varieties of pine, long leaf and short leaf, and which was better for commercial purposes was conducted. In connection with our own native pine we took up the study of the "blister rust" which has become so prevalent and which the different states have been working against. Material for this work was secured from our own state department, and from the U. S. Department of Agriculture. Quite a little work was done on the byproducts of the pine tree, pitch, tar and resin and their uses. In looking up the different kinds of lumber used in our country, we found that 38 per cent of all lumber consumed was southern pine, also that there was an annual production of over 16,000,000 board feet.

Industrial History and Geography—Junior Two.

The work in history and geography was followed out in much the same manner as the work in connection with sheet metal. Maps were used constantly, and sections of the country located from which the pine

comes. Transportation routes, freight rates, bills of lading, car numbers and all other material necessary for tracing a shipment of lumber from the south to Springfield, Mass., was taken up. Much added work was brought out by a study of the "blister rust," and very valuable material was secured from the government for this work. Mr. Twichell, the shop instructor, showed the boys pictures on logging and lumbering, which made the history and geography very vivid. Forests of pine, cypress, etc., were shown and other views of the section of the country from which they came. The great forests of gulf cypress and Louisiana cypress were very interesting to the boys, and the different kinds of saws, methods of hauling logs from the forest and the final finished product of the boards ready for shipment were shown. After the pictures, the boys went back to the classroom and on outline maps located and traced routes of transportation. Much work on the different lines of railroads, the location of definite cities, etc., was done. In addition to this a thorough study of the southern section of our country was taken up. We also worked in some colonial history which the boys needed at this time on brick ovens, warming pans, etc. Different boys went to the science museum and saw the old warming pans and hand stoves used by the early settlers of Springfield.

At this point we spent quite a little time studying the commercial uses of southern pine and were amazed to find that it was used for interior and exterior finish, floors, frame work, siding, sheathing, in heavy construction work for trestles, beams, sleepers, joists, rafters and sills. It is also used for agricultural implements, in machine construction for cranes, dredges, crushers, etc., where the wood must possess strength, toughness and durability, also for boats and during the recent war much was used in ship building. This information was secured from booklets gotten out by the Southern Pine Association, beautifully illustrated, and giving much useful information. Another amazing use of southern pine which the instructor knew nothing about was found to be for wood paving blocks. From this a lesson developed on our own street department.

Community Civics—Junior Two and Three.

When we had learned that southern pine was used for wood paving blocks, the boys immediately began to investigate and found much wood paving in Springfield. We learned also from booklets that Boston was the pioneer city in wood-block paving in the eastern states, the first treated wood-block pavement being laid in 1900 in Tremont Street. New York City took it up in 1902, Baltimore, Md., in 1901, Detroit in 1905 and many other cities were found to be using it. All of these cities were located which impressed a little more geography of the locational kind on the minds of the boys. To be still more authentic we sent to the U. S. Department of Agriculture for a booklet on "Wood Paving in the United States," and found out that Russia used wooden blocks for paving several centuries ago. We found in this booklet comparative values of different pavements, and although creosoted southern pine was more expensive it stood up much better than macadam, brick, asphalt, and was conceded by many to be more desirable than granite or sand stone. In Baltimore, Md., in the summer of 1901, there were laid several adjacent streets of experimental pavements, including sheet asphalt, creosoted wood, and several kinds of brick. After five years' service, and after passing through the great fire, the wood was in better condition than any of the others.

From this wood-block foundation we went on and made a study of our own street department, the boys finding out who was superintendent of streets, his duties, salary, qualifications necessary for such a position, how many miles of paved streets in our own city, certain regulations for taking care of garbage and ashes which few cities undertake, and the necessity for keeping streets clean and attractive. We used the Municipal Register, the City Planning Program and any other current material which gave us up-to-date information on our own street department.

Arithmetic—Junior Two.

The arithmetic work necessary to find the cost of the job was getting the number of board feet used in the construction of cases for the cookers. Boards were brought from the shop right into the classroom, where we measured and planned out, following shop specifications, in order to get the amount used. As a check on this we compared with the record of the stock clerk, and found that our figures were not far from the total number of boards he had given out. The estimated amount used including waste was 300 board feet. The bills for southern pine at this time showed a charge of $100 per thousand. Right here much drill in percentage was given in comparing the cost of Southern Pine with Whitewood which was formerly used in nearly all our shops. During the war, however, the price of whitewood went up from $40 per thousand to nearly $150 per thousand. In this way the boys computed the percentage of increase in costs, and also why it was cheaper to use southern pine at present rather than whitewood. Old bills were referred to for this work and pre-war prices were used to show the percentage of increase not only in lumber, but in all other shop materials, such as nails, screws and all kinds of tools.

Three hundred board feet of southern pine was used at a cost of ten cents per foot, 25 feet of cypress at a cost of twelve cents per foot, bringing the total cost of lumber up to $33. To find the number of nails to a pound, the shop instructor referred us to the Simond's Guide where we found five penny nails, length 1¾ inches, of common wire, came 270 to a pound. In like manner we estimated the number of screws used, took up the number in a gross, how many gross used and finally checked up with our stock record clerk where we found that the nails and screws for the job amounted to approximately $1.50.

A final summary sheet was made from time cards on the cost of labor for both sheet metal work and woodwork, taking into consideration that a carpenter or sheet metal worker would demand about 90 cents per hour at this time. This is a very necessary factor in showing the boys the commercial value of an article. Next came the cost of shellac and varnish used which was estimated to be about $2.50. Right here we worked from our bill again finding out how much shellac cost per gallon and again referring to hand books found out how much varnish was needed per square foot for a first coat, second coat, etc. The asbestos used formed a very small item; much valuable work on the reasons for using asbestos, where mined and the different ways in which asbestos is used in industry. Several samples of asbestos roofing was secured from a firm in Ambler, Penn., and the very common use of asbestos in curtains in theaters was brought out.

Community Civics—Junior Two and Three.

Following the use of asbestos, the work of the fire department, fire prevention, and protection was taken up. Much arithmetic was worked out in connection with fire losses, comparisons being made on per capita losses in this country, France, Germany, Holland and Belgium. (See Every Day Arithmetic). The fire losses per person in this country were found to be much greater than in the foreign countries, and in this connection much time was spent on fire prevention. Then a very definite study of our own Springfield fire department was made, and in this as in our study of our street department we followed the excellent plan mapped out by Dr. Jessie M. Law, supervisor of community civics in Springfield, Massachusetts.

English—Junior Two.

Oral and written descriptions, and some narration, much reading from magazines and all sorts of reference books was continued during the study of this project. Some excellent papers were passed in, some of the boys sketching the old fashioned fireplace and brick oven, and writing up the story of the evolution of methods since colonial days. Spelling words used in the construction of the cookers, all necessary trade words, important cities from which materials came, states, etc., were all used for drill work in spelling. Oral grammar work was not neglected and sentences like the following were used for drill work:

Izzy and (I, me) did the planing.
(Who, whom) is the foreman of the job?
It was (I, me) who kept the time.
(We, us) boys did the squaring.
Mr. Twichell told (he, him) to get out the stock.
He would not (accept, except) my figures.
The work was done (well, good).
He (did, done) the finishing.
I (saw, seen) the mistake.
Please (leave, let) me go to the shop.

A final summary sheet was then made up by each boy setting forth the costs of the different materials, labor and overhead. From this we arrived at an approximate cost of three dollars for each fireless cooker. The summary sheets were found to be very valuable as they left a very businesslike impression on the boys. It brought out the idea of the whole project, and trained them in businesslike methods of finishing up a definite piece of work.

In connection with every job, we tried to give the boys an ideal. Stories of how John Wanamaker, Andrew Carnegie, Charles Schwab and Stephen Girard had made good were an inspiration to them. We found them reading lives of many great men who had started out in life as poor boys. All sorts of magazines were used for this work, and the library consulted as well. We found it a very stimulating thing to boys without ambition to show them the hardships which had beset many a man, but who finally, through hard work,

PRACTICAL ARTS DEPARTMENT.
Central St. Jr. High School,
Springfield, Mass.
Woodshop.

Class J—II and III. Job. No. 48.
Date April 15, 1920. Project—25 Fireless Cookers.

Assignment Sheet for Teachers.

The boys in this class have started the cases for the 25 fireless cookers. Metal parts to be made by J—III.

As the job progresses, data for various sorts of related work in all subjects will be furnished to suit the needs of the academic class.

The stock for this job is ⅛ inch clear pine bought from a firm in the South, and shipped with lumber for the vocational school.

For working drawings and specifications see Shop Job Card No. 48 which may be used in classroom.

Suggestions for related lessons.

ENGLISH:

1. Have boy write office for information as to prices, location of sources, transportation, etc.
2. Write specifications as to construction (see boy's assignment).
3. Composition—
   See boys' sheet for topics.
   a. Description: Tools, Jigs, Cooker, etc.
   b. Exposition: Various processes used in shop.
   c. Narration: Incidents in the day's work in shop. Imaginative stories of lumber camp based upon lantern slide pictures shown to class. Spelling lists of trade words as well as others suggested by the entire procedure.

MATHEMATICS:

1. Compute all time and shop records for drill in processes.
2. Review board feet by making estimate of the cost of stock.
3. Find actual cost from amount of timber used. (See stock clerk's reports.)
4. Add fifteen per cent for "overhead" and 20 per cent profit, then find price at which we may sell these cookers.
5. Special operations will be provided as classroom teacher may indicate.

HISTORY:

Evolution of cooking methods and whatever contemporary history can be taught at this time. Colonial history—customs of colonial times; brick ovens, husking bees, house raisings, quilting parties, etc.

GEOGRAPHY:

This subject can here be tied up with history as the development proceeds.

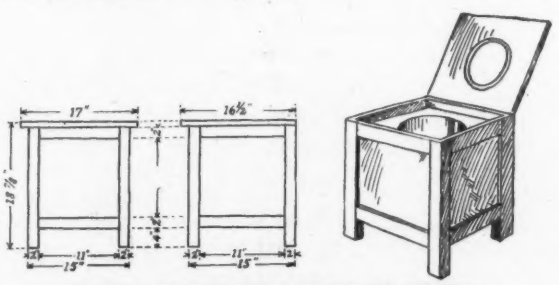
Transportation maps will work in here. (The Government maps on Forestry will be found useful.)

SCIENCE:

Subject of heat and insulation will be taken up and taught in shop as well as the relation of moisture to expansion and contraction.

REMARKS:

Details not clear to the academic teacher will be explained from time to time. As the project progresses, assignment sheets will be sent giving suggestions for Related Work in Sheet Metal (Tin) and Asbestos.



DETAILS AND SKETCH OF FIRELESS COOKER.

honesty and courage, had arrived at a place of responsibility. Abraham Lincoln said, "I'll study and perhaps my chance will come," and it did come, as it will come to every American boy who has the "'stuff" in him to persevere, as did the great martyred president.

As there is some poetry or music in every human soul, so these boys working out a project of 25 fireless cookers loved poetry and music. After a hard period of work in the shop, when the boys had washed and returned to the classroom, occasionally time was taken for some good "sings." Much enjoyment was also gotten out of such poems as "Clang of the Forge," "Ship of State," "Old Ironsides," "Captain, Oh My Captain," "Flanders Fields" and "America's Answer," also Robert Service's "Rimes of a Red Cross Man." Many of the last mentioned poems were memorizel by the boys, also "Flanders Fields" and "America's Answer," and I am sure that these masterpieces which came from the world war are just as much imbedded in the souls of our boys as were the old Civil War poems in the school boys of fifty years ago. These boys have a right to be taught how to spend their leisure time, therefore, the more we can make them love good books, good music and poetry, the better citizens we will have in our community. I never meet a boy who has been a former pupil of mine and gone on with the ambition which we planned and tried to give him in school, but what I feel, as he recounts his success in life, an honest pride in the work done for the individual, the community and the state.

STUDYING THE COOKER IN CLASS.

TEACHING FIFTH GRADE WOODWORK. III.

THE WAGON

Fred L. Curran, Supervisor of Practice Teaching, Stout Institute, Menomonie, Wisconsin

THE small farm wagon is successful in fifth and sixth-grade classes. By the use of the wheel cutter which was described and shown in the February number the wheels can be cut quite easily from ⅜" basswood or pine lumber, and the success of the project depends quite largely on how well and how easily the wheels can be made. The wheels are fastened to the axles with round head blued screws (Size 1½-14) and washers are placed both outside and inside of the wheels.

The wagon as a project may be considered complete when made with box as shown in upper drawing, but further interest is developed if a stock rack, hay rack, and seat are made to fit the box. The illustrations show the wagons complete with stock and hay racks. Some of the faster workers may make three or four types of racks while the slower ones will be able to make but one or two.

Order of Procedure.

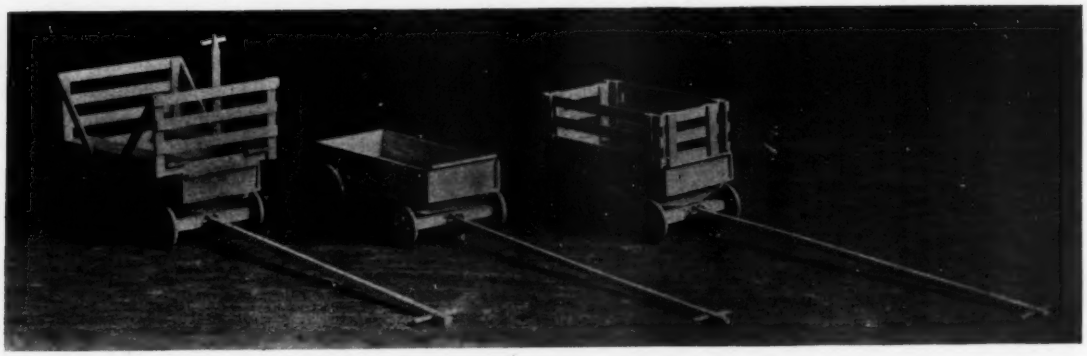
The box is usually made first. The axles are then made and they are fastened to the box by driving nails or brads through the box into the axles. These nails or brads should be about one inch long and should be driven at an angle to prevent the axle from working loose. The movable part of the front axle is fastened to the stationary part with a round head screw. A washer is placed between the two parts to enable the lower part to turn freely. The wheels are next made and attached to the axles. Care should be taken in locating screws so wheels will all touch the floor when assembled. The tongue is made last and fastened to the axle with strips of tin or iron.

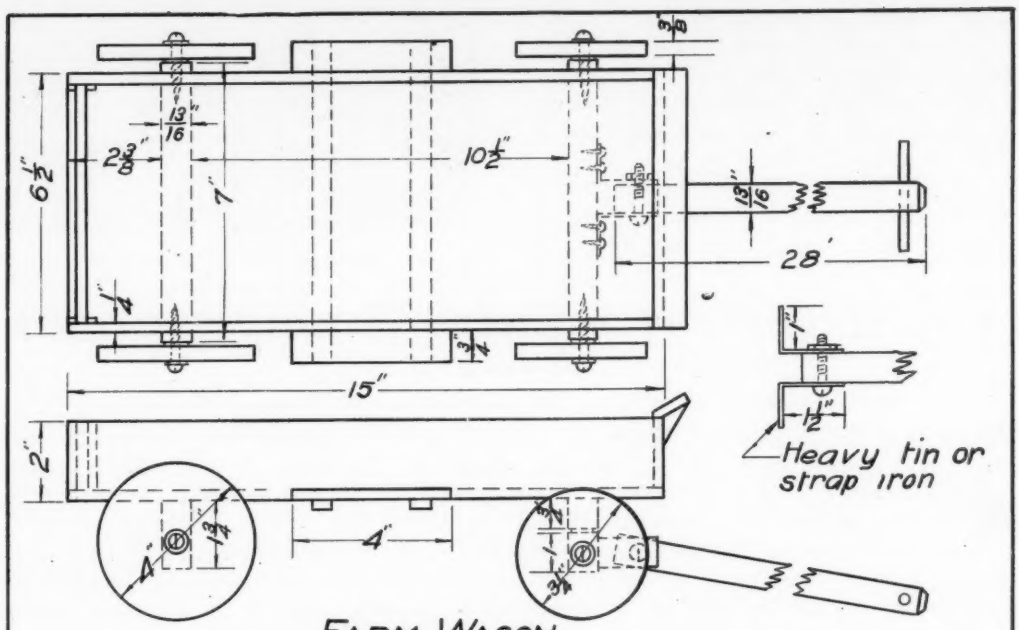
System in Handling Materials.

One of the most difficult problems in teaching woodwork in fifth grades is the handling of materials economically as to time and cost. First of all each boy must have some place to put his unfinished work and materials at the end of the work period. This may be a drawer or cabinet or even a box, but whatever it is each boy must be made to feel that he is responsible for taking care of his work. The duty of the teacher is to see that each boy's work is safe from one work period to the next. In order that the work run smoothly such small materials as brads, nails, screws and washers should be issued to boys in small individual boxes which they may keep in their cabinets or boxes. At intervals of one or two weeks each boy should submit his box or cabinet for inspection. At this time all unused materials should be returned to the regular stock and supply cabinet.

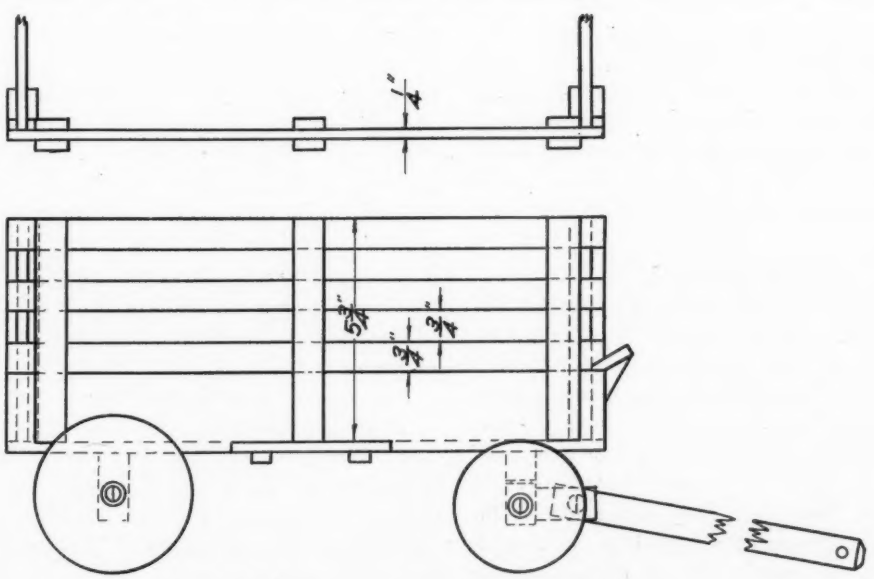
Caring for Tools.

Fifth-grade boys are interested in the finishing of their projects but they must also be made conscious of the necessity of taking care of the tools which they use. It is just as much a part of their education to develop a real desire to take care of the tools in the shop as it is to do the construction work. The first step in this di-





FARM WAGON



WAGON with STOCK RACK

FIG. 2. THE CLASS AND THE WAGONS IT MADE.

rection is for the teacher to have a definite place for each tool, and second, to see that each boy learns where each tool belongs, and third, to see that each boy puts the tool in its place when he is through using it. Teachers can well afford to spend considerable effort at the beginning of the year in getting right habits formed by the boys as they start using tools and materials. A few habits carefully developed at the beginning will prevent much confusion, restlessness, dissatisfaction, and poor work later in the year.

THE CASE AGAINST THE MUSSY LINE

Edwin M. Love, Alhambra, California

"YOUR lines are mussy!" Expressed in words, this is undoubtedly the first criticism that an architect has to make on the work of student draftsmen who come to his office for practical experience during the summer vacations. This is a criticism of the fundamentals of drafting technic, and therefore a reflection on the school drafting classes and their instructors.

No discussion of the merits of the case is necessary. Any casual glance at school exhibitions of drafting confirms the justice of the criticism. Especially is this true of pencil drawings, which usually are characterized by weak, ragged lines and faulty intersections or corners. Such plates may be scrupulously clean and well balanced in arrangement, but the irregular lines more than offset the good points. More often than not they express a fatal deficiency in the ground work that ought to be given to every beginner.

It is in the manual training room of the grade school that the average drafting student receives his first lessons in drafting. Here he learns to express in plain figures the three-dimensional box or taboret that he is to build in the shop. Through the medium of the drafting board he begins to sense the practical value of arithmetic and the usefulness of graphic solutions of problems. But because the allotted time for shopwork is small, and the extent of its compass and purpose large, drawing is as a rule confined to a few minutes of time literally stolen from the precious shop period. Too often the boys consider it an unnecessary evil and hurry through their drawings in a slipshod manner, while the busy teacher gives such slight individual instruction as he can.

Under such conditions high ideals can not be attained. But vast improvement in the average work turned out by beginners can be made by giving a little time to the specific problem of "snappy" drawing. Seventh and eighth grade boys are quick to improve when shown what methods will bring the improvement, while even fifth grade boys can be expected to develop reasonably firm lines. Most boys readily see the difference between a poor drawing plate and a good one, though frequently they cannot tell where the difference lies, or what steps should be taken to remedy the defects of the inferior drawing.

Evidently lines do not of themselves interest boys enough to warrant their being used for their own sake as preliminary exercises in drafting. But when such proficiency in composition has been attained that students can draw simple plans with a fair degree of accuracy in the laying out, it is high time to begin the propaganda of neat delineation. At this time make a collection of the best plates and encourage the class to discuss them frankly. When in the course of the discussion the importance of firm lines has been brought out, the question of how to make them should be raised.

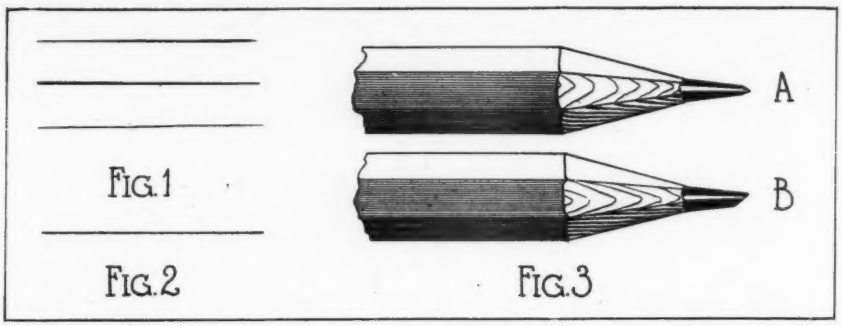


FIG. 1

FIG. 2

FIG. 3

Ask one of the boys to draw a line. It will probably be similar to one of the three shown in Fig. 1. By questioning the other students its faults can be quickly found. One will say, "It's thicker in the middle than it is at the ends"; another will mention a quaver or quirk, and someone else will likely think that it doesn't seem to start or stop at any particular place.

Having isolated these faults, the boys can appreciate the crisp, clear definition exhibited by a line drawn by the teacher or one of the progressive boys who has "caught the trick." Fig. 2 illustrates such a line. If now all the students draw a line, considerable improvement will be noted, though the dull pencil point and the uneven wearing of the lead will count heavily against the looks.

The mechanics of the drawing of a line is the next consideration. No dull pencil points should be tolerated; it is a simple matter for each boy to keep a piece of fine sandpaper near for touching up his pencil. A long, conical point is unquestionably the best for students, as it is the usual preference of the professional draftsman. To draw the line, place the point firmly on the paper; rotate it slightly, if necessary, to make a positive start, and with a firm, even pressure, together with a continuous rotary motion of the pencil, move along the straightedge to the end, where a sufficient pause is made to give proper definition, and lift the point. The rotating of the pencil causes the point to wear as in A, Fig. 3, preserving a point at the center, rather than wearing a flat on the side, as in B, Fig. 3, which would result in the line being wider at the end than at the beginning.

After a few lessons in which line drawing is stressed, a study of drawing corners may be taken up. Just as the average student draws ragged lines, he forms corners with little regard to the simple elements that govern their construction. If a reading glass or other lens is available, the boys can readily see why the corners that they draw lack the something that should make them crisp and firm. Under the lens these corners appear as shown in A, Fig. 4. The ends of the lines are semi-circular in outline. Either they merely come close together, leaving a gap between, or their curves are tangent and show a reverse angle at the outer edge. How different the result when the lines are slightly crossed, as in B, Fig. 4. There is no question here about the angle being sharp, even when magnified. The ends of the lines are beyond the intersection, leaving the crisp, straight edges of the line to form the angle.

After all, the most difficult problems frequently hinge on simple propositions. The mussy line can be largely eliminated by the use of these two little lessons and occasional judicious reminders whenever the students become careless.

FIG. 4

HAND CARVED PICTURE FRAMES

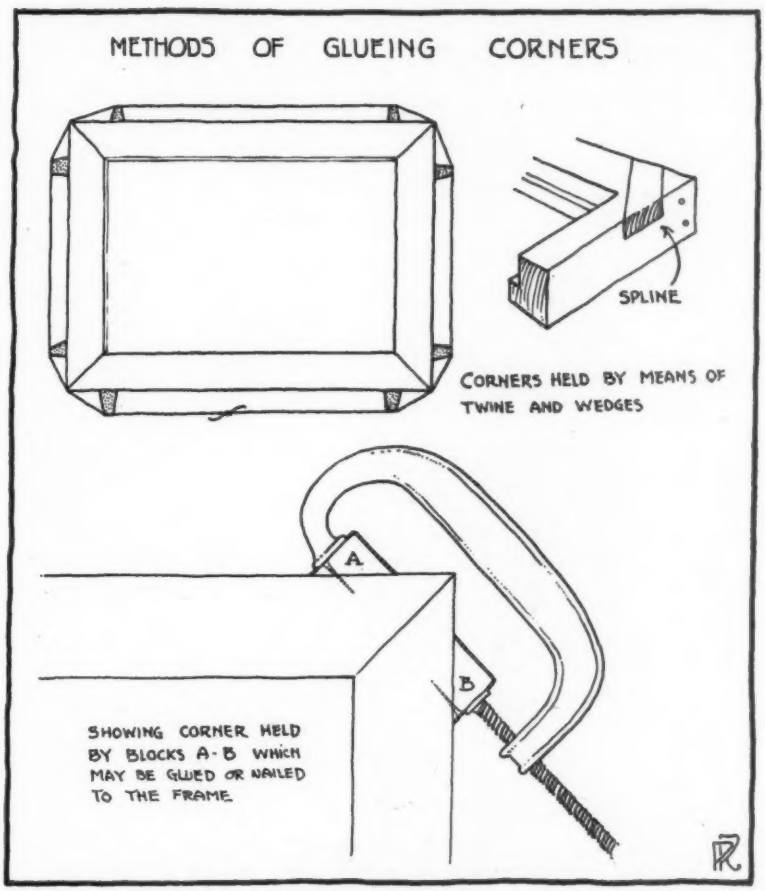
Charles H. Richert and Otis Philbrick, Rindge Technical School, Cambridge, Mass.

THE horrible examples in picture framing may be divided into three classes. Perhaps the most atrocious class is the over-ornate one with deeply carved floral embellishments of all sorts which prevent one from looking at the picture within it. Next comes our old familiar friend, the pride and standby of the carpentry shop—the frame made of natural oak or other highly grained wood—made by a man who loves the grain in wood and cannot resist the temptation to bring it out in great curly waves across the width of the frame. What picture if properly harmonious and pleasing could compete with this? And last but not least offensive is the frame painted with a cheap, cheap coat of bright, bright glittering bronze and left untoned so that the picture, if one can see it at all looks exceedingly dark and gloomy.

The fault with these frames lies in the fact that each in its particular way clamors for notice and attention whereas a good frame is unobtrusive and subservient to the picture within it.

It is the purpose of this article to describe clearly and concisely the designing, carving and finishing of a few simple artistic picture frames.

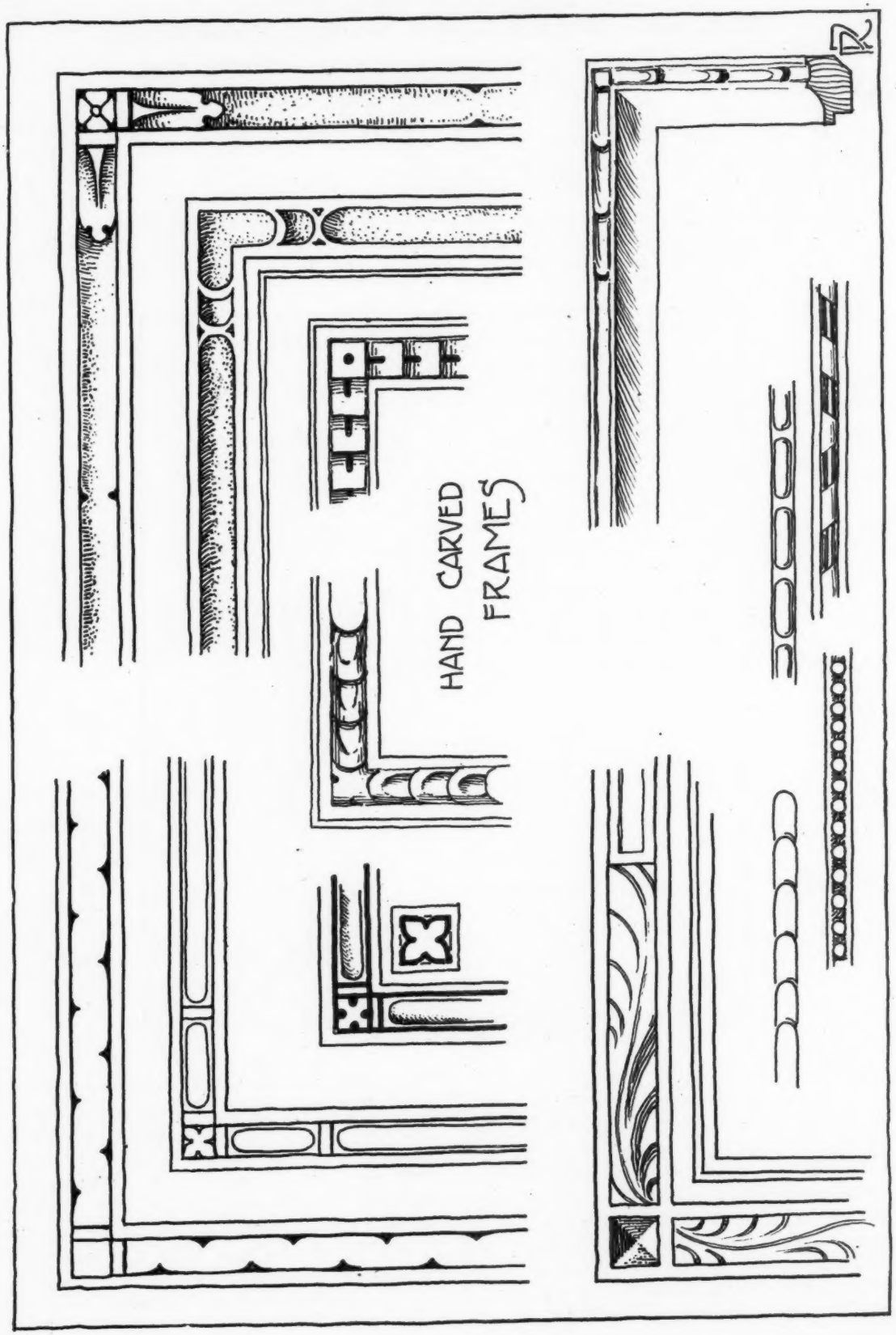
The first consideration is the kind of wood from which the frame is to be made. Clear straight-grained pine is a joy to carve—poor pine is an abomination. Oak is harder to work and requires exceedingly sharp tools. White wood answers all requirements satisfactorily. The wood of course must be rabbeted on the inner edge to allow for glass, etc., before being joined.


METHODS OF GLUEING CORNERS
SPLINE
CORNERS HELD BY MEANS OF TWINE AND WEDGES
A
B
SHOWING CORNER HELD BY BLOCKS A-B WHICH MAY BE GLUED OR NAILED TO THE FRAME

CONSTRUCTION OF CORNERS AND METHODS OF GLUING.

To mitre and glue the four corners of a frame accurately and permanently calls for considerable nicety and ingenuity. It takes both glue and nails to hold the corners properly; even then if the frame has much width, it will have a natural tendency to crack open on the inside of corners.

The drawings show two methods of holding the corners together while gluing. The clamps are best for very large frames and anything over 25″ x 30″ but the


HAND CARVED
FRAMES

arrangement of string and small wooden wedges shown is very ingenious and efficient. Glue the corners and place the pieces in position, tie the string around the frame and arrange the wedges. The two small wooden wedges are placed together in the center of each side and pushed one toward each corner to tighten. If more than one frame is to be made it will be found worth while to take the time to make a small groove with a gouge over the top of each wooden wedge where the string passes over. This keeps the string from slipping off while tightening. Before putting the corners together give them a thin coat of glue and allow to dry for a few minutes. When the final coating of glue is put over this it will stay there, hold the corners together and will not be absorbed into the wood.

Do not depend upon glue alone; nail the frame securely and set the nails. After the glue has dried for 24 hours it can be easily nailed by holding in a wooden vise the side into which you are nailing.

The frame is now ready for carving, the design for which should be worked out on paper full size and traced. Several designs are shown. They can be varied and adapted in a great many different ways. Keep the designs simple. The shapes used need not look like or suggest anything—the whole purpose is to make a pleasing pattern. Do not try to make the frame into a picture—the picture goes into the frame. The corners can stand more elaboration than the sides.

Do not think it necessary that because the picture contains *boats* the frame should be carved into shapes resembling crabshells and other things marine, or if *horses* it should be framed with a pattern of horseshoes, or if a hunting picture it should have a frame made of actual feet of plover and snipe intertwined and varnished to surround it. This is not exaggeration. These things exist. Do not think that the frame need have anything in common with the picture as far as sentiment or motive is concerned.

But it should have everything in common with the picture so far as tone, color and proportions are concerned. To hold the picture and glass together—to cut the picture away from its surroundings in a pleasing and not too abrupt manner and not intrude upon the onlooker's vision—that is the purpose of a picture frame.

All this should be considered in designing a picture frame.

It is decidedly worth while to glue together a corner out of the pieces left over after cutting the mitres, upon which to practice carving a corner design. Do not carve the design too deeply and avoid having too many different depths.

Simple beads running lengthwise—careful attention to the proportions of the width of the frame—and a little elaboration in the corners—that is the recipe upon which many a good frame can be designed. Study good frames after you are able to recognize them. They will help in designing your own. Historic ornament contains a wealth of material for this purpose if judiciously used. After the frame is carved it may be treated in several different ways. For a quick, simple result the frame may be sandpapered, shellaced and bronzed. Do not sandpaper too much or the carving will lose its character. Orange shellac is better than white as it gives a better undertone for the gold. Still better mix some dry burnt sienna with the shellac and coat the wood with it; two or three coats will do no harm. This gives a very sympathetic ground upon which to bronze, very much like the red gold size upon which gold leaf is laid.

Again the raw frame may be treated to several coats of a mixture of thin glue made of parchment shavings mixed with gilder's bolted whitening. The mixture should have the consistency of heavy cream and feel slightly sticky. It should be painted on luke warm with a brush and allowed to dry. Go over it lightly with fine sandpaper and coat again. Add sufficient coatings to reduce the harshness of the carving to the desired degree. This method gives a subtlety and delicacy of modeling that can be obtained in no other way. A frame resembling beaten gold is made by laying gold leaf upon the same preparation.

In bronzing if the frame is to be toned after bronzing select a bright, light gold bronzing powder. If not to be toned use a rather low-toned bronze. Use the best bronze powder—the cheap grades will have a mealy look when put on that is disagreeable. The surface upon which the bronze is to be put should be smooth and coated with glue or shellac, otherwise the medium with which the bronze is mixed will be absorbed into the wood leaving the powdered bronze to rub off easily.

The final flavor of a picture frame is imparted by means of toning. Toning is the process by which a frame is brought into harmony with the picture. This is done by putting into the frame some color which gives a hint of the predominating color in the picture. This is not difficult to do and makes a world of difference. Use oil paint mixed with turpentine or gasoline so that it will dry in flat and not look shiny. Mix the proper color and paint it all over the frame and with a clean dry rag wipe it off carefully. High places in the carving will be wiped entirely free of paint while the low places will retain it.

This treatment gives the frame a very considerable degree of refinement, the advantage of which will be fully appreciated by anyone who has applied or seen it applied. Of course the color chosen for toning is of great importance. Keep the colors quieter than the colors in the picture. It is very easy and tempting to overstep the bounds of good tatste in this matter. There are many frames offered for sale in the shops which have been toned in the manner described but which might be criticized for the relations between the colors in the picture and frame. Perhaps the most striking and unfortunate examples are the ones in which an attempt has been made to repeat the colors in a Maxfield Parrish picture in the frame around it. The blue for

instance, that exquisite quality of blue or blue green or blue purple in sky or sea over which Mr. Parrish has probably slaved almost with "fasting and prayer," has been killed by a garish vivid more powerful but very ordinary blue in the frame.

One of the most important qualities which go to make up good taste and refinement in art is the power to resist the influence which vivid color exercises over so many of us.

THE PUBLIC SCHOOL PLACEMENT BUREAU

F. M. Trumbull, Dept. Vocational Guidance and Placement, Rockford, Ill.

The problem of organizing human labor resources has emerged, like many other social and economic problems, from the realm of academic discussion into that of practical action and tangible results. Having sensed the need we have sought for ways and means of so organizing our labor resources that society may have the benefit of the best and most efficient service the individual may render and that the individual may receive the highest possible return for his service and get the greatest possible enjoyment in that service. The vocational guidance movement and the school placement bureau have grown out of our effort to accomplish these aims.

The school is assuming great responsibility for the preparation of satisfied and satisfactory employes. To that end guidance is being provided so that boys and girls may make a rational and wise choice in selecting their vocations. Elementary school courses are being broadened and enriched enabling children to find and develop their interests and capacities. High school courses are being broadened and enriched enabling them to test and to follow up those interests and capacities with special training preparing either for further study or preparing directly for entering an occupation in accord with those interests and capacities.

The old narrow academic high school course of a few years ago which was essentially a classical-college preparatory course and which was taken advantage of by only a very small percentage of boys and girls has given way to elective curricula which include along with classical and other college preparatory courses, courses which offer definite vocational training which carries immediate, available value for entering and making progress in an occupation. Coincident with this broadening and enriching of elementary and high school courses the attendance of pupils in high schools has during the past twenty years increased six times as fast as our population has increased.

With these larger opportunities for training available in the public schools, boys and girls in their early youth can not afford to leave school to go to work except in cases of extreme necessity. Their time and effort if given to industry during this period in their lives brings only a minimum return. It becomes a major function of vocational guidance to lead these boys and girls to appreciate and to take advantage of the opportunity that school offers for making a preparation that will enable them to enter their chosen occupation at a higher level or to more speedily attain the higher levels if not to enter upon them directly.

After the vocational guidance department has aided a pupil in choosing a vocation and has influenced him to make the best possible use of his school opportunities in preparing for that vocation, there still remains a very definite obligation to be fulfilled. When the time comes for the pupil to leave school an obligation rests upon the vocational guidance department to aid that pupil to enter the world's service at a point where he can render the most efficient service. Furthermore there remains the obligation to follow up that pupil after he goes to work and in every practicable way aid him to make progress in his vocation.

In the discharge of these obligations the vocational guidance department must establish a placement bureau. This bureau becomes in effect a sales agency for the product of the schools. In order to efficiently function as a sales agency it must know its goods and in that it does not send its applicants as average boys or average girls to average jobs but as individuals selected to fill individual positions.

Individual differences resulting in varying interests, aptitudes, capacities, and attainments require that the bureau have at its command specific and detailed information regarding each boy and girl that may come before it for assistance. On the other hand the placement official must have a wide general knowledge of the various industrial and commercial occupations carried on in his community and must get into intimate personal acquaintance with employment managers. Before referring children he must know very definitely just what are the specific requirements for each particular job for which an applicant is sought.

The gathering of specific information regarding boys and girls can be accomplished by cooperation of teachers and school counselors with the central office. The counselor should be responsible for a cumulative system of record cards which will give a relevant history of the individual pupil from the time he first enters school. This record should be built up from teachers' reports and estimates of academic ability, physical and health records, nurses and physicians reports, general intelligence tests, special tests, and reports that indicate any special interests or aptitudes that may be revealed at any point in the pupils' school work or outside activi-

ties. Counselors should visit homes to discover environmental influences. As the pupil enters high school and at intervals of perhaps two years thereafter questionnaires should be filed including answers to questions that will bring out the pupil's self analysis and developing interests.

All this information should be brought to the central office when the pupil comes seeking placement. If possible his school counselor should accompany him to join in conference with the placement official. Issuance of work permits to pupils under sixteen years of age should be handled by the placement official, the applications coming through recommendation of the counselor.

The workers that come to the school placement official for assistance include "after school and Saturday" workers, "part-time continuation school" workers, "vacation" workers, those leaving school to become full time workers, and those of any of these classes that may seek replacement after having lost or left their jobs for various reasons. In these groups are youths of every degree of intelligence and ability, some with executive and inventive abilities or capacities, others with average intelligence but lacking initiative, and others of low grade capacity. When an applicant comes before the placement official for an interview, with the help of the records which indicate his abilities, aptitudes and ambitions, whether certain potentialities be present, whether he be generally intelligent and efficient or whether he will probably never be so, that official must analyze the applicants vocational needs and capacities. With the help of the most complete data available this interview still calls for unusual skill and a wide experience if it is to be profitable and real assistance is to be rendered. The skillful official will secure the confidence of the applicant, will be able to make him feel at ease, and free from selfconsciousness, so that he will talk freely of himself, his interests, and his intentions. Even if the official should decide that the applicant should go back to school, or back to his job if he is simply dissatisfied without sufficient reason, that advice must be handled with discretion. No advice can be effective unless it becomes the result of the applicant's own judgment based on facts brought out in the interview.

After the official has drawn his conclusions regarding an applicant and has decided that he deserves placement or replacement as the case may be, he must next consider the market open for the service offered. At this point efficiency on the part of the official will depend upon his wide knowledge of occupations and his intimacy with local employment conditions and the extent of cooperation he has secured with employment managers.

The securing of this cooperation is a big field of work in itself. It calls for the finest skill and conservative judgment on the part of the official making and maintaining contacts with employers. Interviews with employers are as crucial as interviews with applicants. A personal interview with an employer offers opportunity to find out specific information as to necessary qualifications for workers in particular jobs or classes of work, conditions under which they must work, and opportunity for advancement. It gives an opportunity to study the personality of the employer to determine whether he may be a fit person to supervise young workers. In these interviews it is important that all possible relevant information be secured during the first interview. Later calls to fill in facts which might have been secured at first are an annoyance to business men and should be avoided if possible. Tact and judgment, though very intangible qualities, are very necessary in seeking information from business men. No one person can tell another how to conduct an interview and how much information to get. A good placement official will get what he wants, perhaps all in the first interview, if not, in later calls.

The question of wage or salary is a very important matter of information and one concerning which employers are sometimes inclined to be reticent. The salary offered may depend on the type of applicant accepted and his special qualifications. Whether or not a definite wage or salary is quoted, the placement official should get sufficient information to have a definite idea of what the position will probably be worth.

Inquiries which belong to factory inspection rather than to job analysis must be handled with care. The official may be told or may be shown working conditions which are far from ideal. He must keep in mind the fact that all establishments grow old and cease to be entirely satisfactory long before it becomes justifiable to condemn them. Some of our public school buildings are as bad or worse than some business houses that the public would be inclined to condemn. However, our boys and girls must be guarded. If there be good reason based on fact, not on sentiment, why an employer should not be sent the junior help he seeks, the facts should be stated frankly and the positions filled with older persons if possible.

Contacts with employers reveal to them the placement officials ability to grasp and deal intelligently with employment problems, and create a favorable impression of his work and of the official as a public servant. This confidence must be maintained and reinforced by the quality of service rendered by the boys and girls who are placed. This in turn depends upon the discretion exercised in referring children. The various phases of work carried on by the bureau are necessarily all interdependent.

In addition to the problem of finding employment for boys and girls that is educational and disciplinary rather than demoralizing, and the problem of fitting the right boys or girls into the right jobs so that they become satisfactory and satisfied employes, the placement bureau in working out these problems finds itself obligated to develop a method of supervising these boys and

girls after they have been placed. This becomes necessary in order to ascertain whether the job proves suitable on the one hand and on the other to see that the worker renders satisfactory service and receives deserved promotions. To watch and to aid these boys and girls in making progress after placement is just as important as finding the jobs.

For them to have contact with a competent and authoritative advisor to whom they may refer in matters of misunderstanding that may arise on the job, guarantees for them fairer treatment from employers and removes to a large extent the temptation to "quit" and to "try another job" on trivial pretexts. The inevitable result of drifting from job to job is the careless taking of any kind of a job, and the formation of the casual habit. A youth following this course becomes, before he knows it, a confirmed casual laborer, always ready to try something new, ever ready to "loaf a bit." In many cases he eventually becomes practically unemployable, discontented, unsocial if not actually anarchistic. By following up and maintaining a contact with the workers he has placed, the placement official can exert an influence which tends to steady the youthful worker. Through this contact he may be able to keep before the worker the vision of bettering his condition through efficient service and square dealing with his employer.

The worker must be taught to appreciate the value and the necessity for cooperation with his employer. He must be taught to recognize that in return for an opportunity to work at a fair wage, under courteous treatment and under sanitary and comfortable working conditions he owes his employer conscientious service, thrift in the use of material, carefulness in the handling of tools and machinery, promptness, regularity, loyalty, and proper notice of withdrawal from service. The extent to which both employer and employe can be encouraged to apply the golden rule determines in a large measure the progress the worker may make in his vocation.

Frequently there comes in follow up work the difficult task of persuading the boy or girl to give up a blind alley job chosen on the basis of present wage to take another job at a lower wage but which offers an opportunity to learn while earning. For some individuals there can be no such thing as a blind alley job, but for a large percentage of the average boys and girls except in the cases of those endowed with an unusual capacity for initiative, much of the employment open to junior workers offers little training and offers no opportunity for advancement to higher levels of employment. A child entering and continuing in the blind-alley type of work finds himself stranded at 16 or 17 years of age, deficient in common school education, untrained and unfit for any employment except casual manual labor. Inherent capacities through repression may atrophy, or through lack of opportunity for development may lie unawakened and never be discovered.

Many boys and girls well placed, liking their jobs, capable of meeting the requirements of their jobs, fully intending to meet those requirements, may still be in great risk of falling by the wayside. They may come from homes where they have been the center of attraction, from school where they have received recognition and praise for every attainment. During their initial experience in industry they find themselves the least essential and lowest paid among the workers. They lack the judgment necessary to understand their insignificance. A little follow up work, a little contact maintained by the placement official may prevent that feeling of resentfulness which tends to grow and which begets the spirit of the I. W. W. and the anarchist. A little interest taken in the young worker's progress may turn discouragement into encouragement and make the job lead to a career.

The success of educational effort to better prepare pupils for vocations can be assured only through recognizing the facts regarding the demands of the commercial and industrial world. These facts must be secured and made available for educational purposes. In carrying out its follow up work the placement bureau has the best possible opportunity for securing vocational information. If children are rejected a followup system discovers the reason. If workers placed fail to make good, followup discovers wherein they did not meet the requirements of the job. Training may be provided for those who come after which will enable them to successfully meet those requirements and make good.

In measuring the success and efficiency of the placement bureau the number of placements made in proportion to the number of referred children may not be a true measure. This may merely indicate labor turnover, which means inefficiency. The true measure of success and efficiency is the number of contended workers retaining their jobs, loyal and buoyant in spirit, believing in their opportunity and ability to advance.

A successful and efficient school placement bureau renders a valuable service to employers and renders a much needed service to boys and girls.

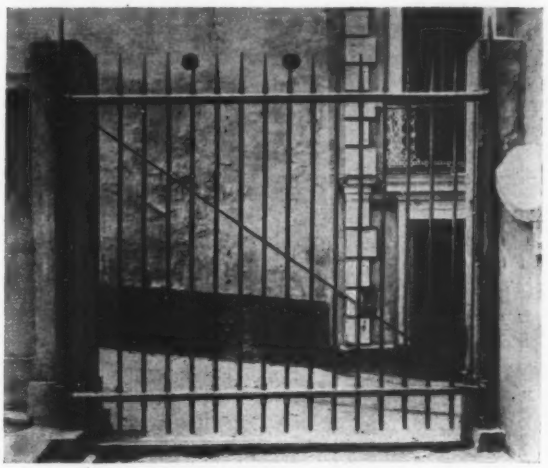
A PRACTICAL PROBLEM IN PIPE FITTING

Herman Hjorth, Director of Technical Work, Roman Baldorioty de Castro Graded and Technical School, San Juan, Porto Rico

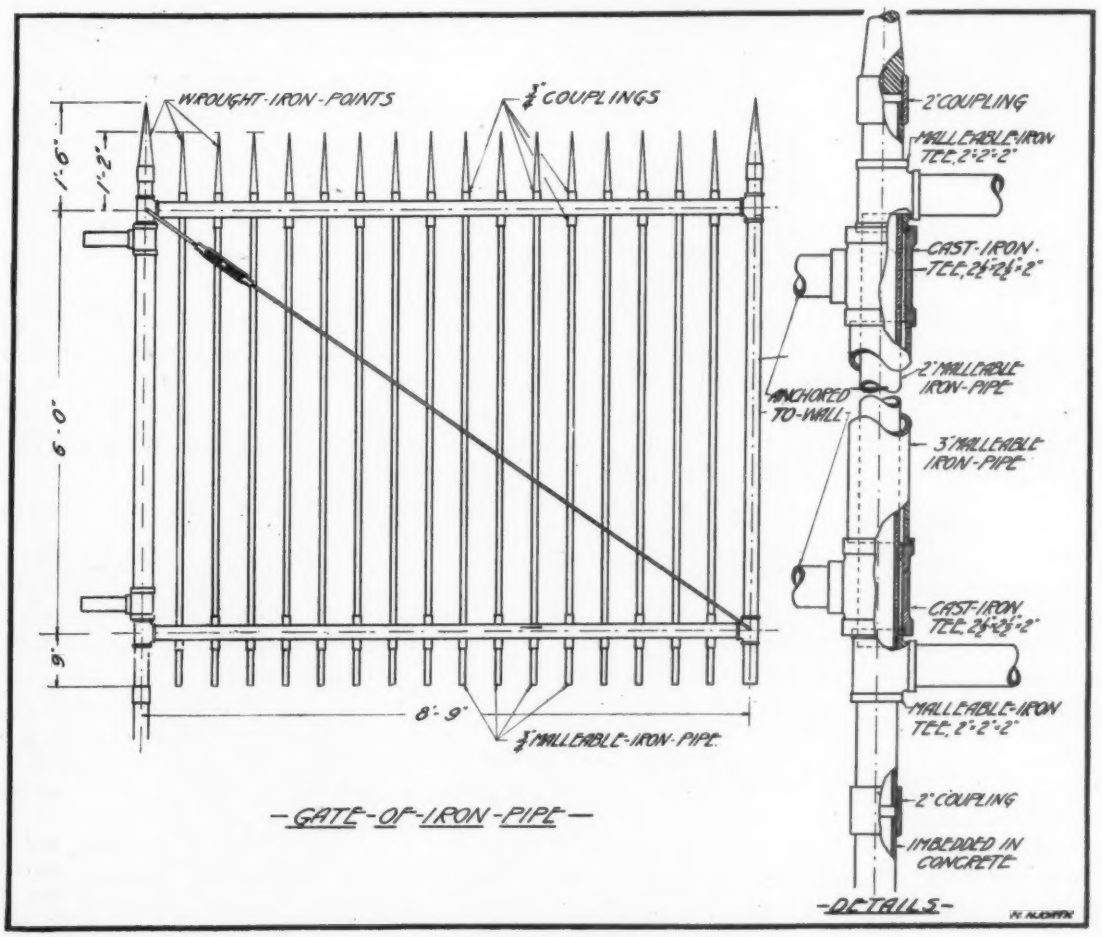
THEN the Baldorioty de Castro Graded and Technical School was finished in 1918, no funds were available for the ornamental iron fence, with which the architect intended to enclose the grounds of the school. As a fence is of paramount importance in this locality, the technical department of the school was asked to construct a provisional fence of some kind. The requirements were: strength, durability, neatness, and, last, but not least, economy.

After considering various materials, malleable iron pipe was finally chosen, and the design and construction of the fence and gate illustrated herewith was worked out by Mr. Harry E. Jarrett, instructor in plumbing, and the writer.

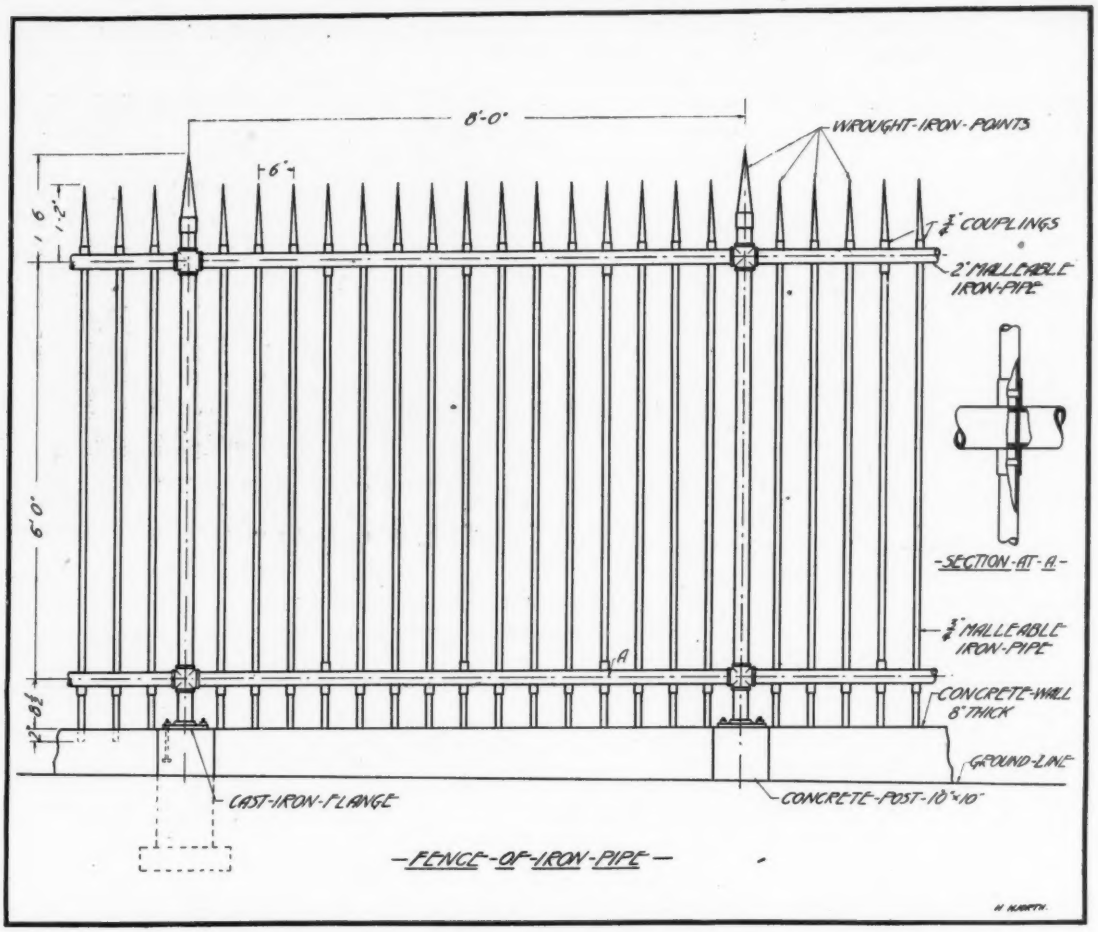
The construction of this fence does not necessarily presuppose a knowledge of plumbing, but it may in fact be worked out in a machine shop or even in a woodworking shop, if the necessary tools are provided. The work here was divided among the different shops in the following manner:



THE GATE SET IN PLACE.



DETAILS OF GATE OF IRON PIPE.



DETAILS OF PIPE FENCE.

The plumbing department did the actual cutting, threading, assembling and erecting of the fence and gate. To the machine shop was allotted the work of turning the tapers on the iron points, recessing the Tee's on the gate, drilling the holes in the 2″ pipe for the ¾″ pipe to pass through, and milling the ¾″ couplings to fit the curve on the 2″ pipe at the top of the fence. The molds as well as the actual concrete work was done by the woodworking department, and drawings and blueprints were gotten out by the mechanical drawing classes from preliminary sketches and specifications.

With regard to the actual construction of the fence, the following points may be of interest. The fence was made in sections of two panels and three panels. A two panel section consists of four 2″ horizontal pipes and three vertical ones. A cross was screwed on each of the horizontal pipes and two crosses on the vertical pipe in the center. Two horizontal pipes were then screwed into each cross on the vertical pipe, thus forming two long horizontal pipes connected by one vertical pipe in the center | . On each of the remaining two vertical pipes a long thread was made on one end and a regular thread on the other. The ends with the long threads were first screwed into the crosses on each end of one of the horizontal pipes as far as possible. They were then backed out, and at the same time entered into the opposite crosses on the other horizontal pipe, care being taken to have the distance between the horizontal pipes the same at all points. On account of the long threads the vertical pipes do not slip out of the lower crosses.

These vertical pipes could also have been fitted together with the two horizontal pipes by means of a right and left thread, but as right and left crosses could not be had in San Juan, we were obliged to use the long thread method.

The tapered points were turned from wrought iron bars and the threads cut with stocks and dies in order to fit the 2″ and ¾″ couplings. The ¾″ couplings on top of the upper horizontal pipe were milled to fit the curve of the pipe, but none of the other couplings were milled, as they had to be screwed up.

The gate was fastened to a concrete post, and the pipes forming the hinges led into holes cut in the concrete and corked with lead. If conditions had demanded it, the gate could have been put into the fence at any point simply by fitting two extra Tee's into the nearest vertical 2″ pipe and screwing the pipes forming the hinge into them. A right and left thread would have to be used in this case.

Summary of Work.

Plumbing Shop.

1. Measuring and cutting pipe to length.
2. Cutting of threads and a study of different makes of stock and dies.
3. Measure of fittings and calculation of allowance for same.
4. The making of a long thread and its use. Right and left threads.
5. Assembling sections of fence according to blueprint.
6. Erecting sections on posts and fitting them together.
7. Corking with lead.

Machine Shop.

1. Taper turning.
2. Use of milling machine.
3. Laying off and centerpunching 2″ pipe for holes to be bored for ¾″ pipe.
4. Use of drill press.
5. Chucking and recessing cast iron Tee's.

Carpenter Shop.

1. Making of molds for concrete posts and intermediate walls.
2. Placing molds at proper distances, level and plumb, and bracing them.
3. Mixing and placing concrete in molds.
4. Removing molds, facing up and curing of concrete.

Drafting Room.

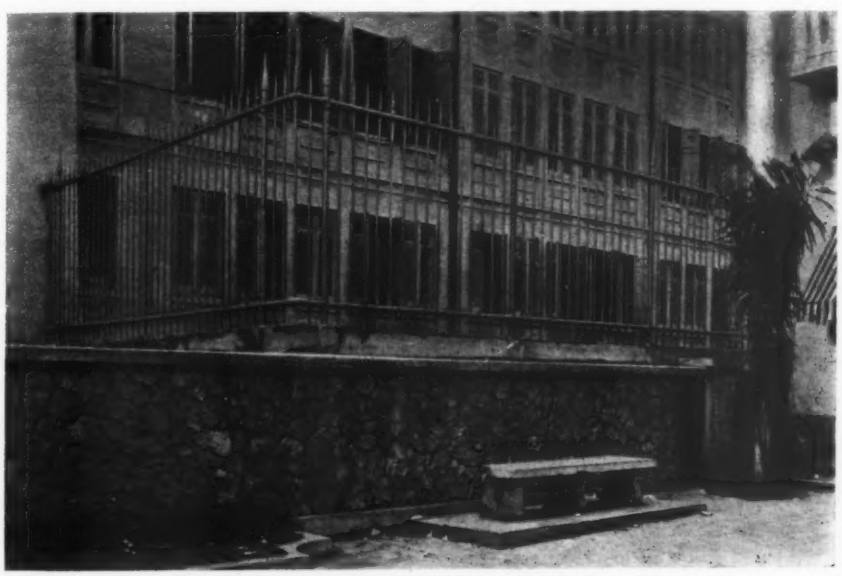
1. Making of drawings according to preliminary sketches.
2. Tracing.
3. Making of blueprints.

Arithmetic.

1. Calculation of length of pipe and number of fittings necessary.

BOY AT WORK ON FENCE PARTS.

2. Problems in pipe fittings.
3. Calculation of wrought iron necessary.
4. Problems in taper turning, feed and speed of lead screw, drills, milling cutters.
5. Calculation of lumber necessary for forms.
6. Calculation of volumes and weights.
7. Cost of pipe, fittings, wrought iron rods, bolts, lumber, stone, sand, cement.
8. Cost of fence per foot.



THE FENCE AS IT APPEARS TODAY.

INDUSTRIAL-ARTS MAGAZINE

E. J. LAKE S. J. VAUGHN
Editors

EDITORIAL

ORGANIZED SOCIETY.

The president's address stressed the need of individual rather than collective responsibility and accomplishment. Warming up to his subject, he lamented the present tendency of the individual to assume that organized society would relieve you and me of doing anything more than behave ourselves under the law.

Organized society has given us a fair chance for the development of our faculties on the supposition that we would return to it in service some measure of the bounty of life and talents developed. It was a timely and appropriate address. It emphasized the imperative need of government by and for the people. It emphasized a weakness of our teaching and of our pupils. Of our teaching, in that our school work had been a routine of lessons to be learned, without question of results other than the program of class exercises.

Of our pupils, in that they had come to school, gone through the course of study, and now were about to graduate as a matter of course established by organized society. What of it? What more can be done than to put that long line of boys and girls under the restraint of definite tasks to perform? What can be better for them than the orderly and persistent training in the conventions of living under organized society? What can be done more than to give them a definite understanding of the things that are and are to be, so that their lives may be adjusted to life as it is, or *as it may be?*

Ah! there is the keynote of the president's injunction. *Life as it may be.* The ability, incentive, and ambition to do something individual for organized society. Not to be just a persistent, busy parasite living on the bounties of nature and organized government, but like the bee, who gathers a bit of sweetness from each blossom and never fails to add a tiny bit of its own individual flavor that transforms the common product into nectar.

OUR LOVE OF ART.

We are now several years on the way to emphasis that art and industry are inseparable. In this emphasis we have drawn conclusions that have not been altogether logical, and we have followed methods of instruction that have not been effective. In the attempt to develop greater skill in design we have often neglected the emotional element without which no great artistic results can be secured. Morris Gray, President of the Museum of Fine Arts of Boston, states in his 1920 report:

"Knowledge about art is common, but love of art that brings happiness and inspiration to the heart of man is rare. One is an intellectual interest, the other is a great emotion. Yet the two are often treated as identical."

There can be no question as to the emotional element necessary to fine art production and appreciation. The problem from the teacher's point of view is the identification of the emotional over the intellectual and the process of developing each.

The frequent confession of the beginner who is brought to a sense of obligation with regard to art, is significant. "I know nothing about art, but I know what I like." This statement indicates that independent choice is not based on knowledge, but is the inevitable heritage of all humanity in whatever stage of development. Every one makes some choice as a result of interest. The art teacher's problem is to give such experiences that will interest every pupil in beauty and propriety. To do this, there must be some innate or some developed incentive. These incentives cannot be developed by arbitrary tasks imposed without reference to choice or interest. Neither can they be imposed by a superior judgment, without conviction on the part of the pupil.

The idea that there is a final and formulated standard of beauty and propriety, to which pupils are to be brought by a series of exercises and a certain definite understanding, is fallacious. All true appreciation is the result of emotional satisfaction. Emotions are to be aroused only to be satisfied and give place in turn to new emotions. Emotion precedes intellectual calculation, and is the starting point rather than the ultimate result of educational process. What we need more than other things in the way of art instruction is the inspirational teacher, who can enthuse his pupils with the desire to create and express their own genuine emotional interests, and so develop to greater emotions and the expression of them.

THE TEACHER AND OTHERS.

"I am placing every graduate of my school at a salary of eighteen hundred dollars and over," said the director of a college of education at the close of the past school year. Colleges of engineering, commerce, and agriculture announce a less favorable outlook for their graduates. These conditions will undoubtedly bring increased numbers to the schools for the training of teachers. It should, in time, allow a more careful selection of candidates for teaching positions.

For several years before the war the schools had gone forward rapidly in the requirements of academic preparation for teachers. The war turned many teachers to other occupations. Now they are coming back, but the demand for capable teachers still exceeds the supply.

Effective teachers have had opportunity during the past year to take a choice of positions from Maine to California. Many well established teachers have taken advantage of this opportunity to move, on the doubtful supposition that a change would give them a widened

advantage of this opportunity to move, on the doubtful supposition that a change would give them a widened experience and a greater outlook for the future.

Let us hope that the nomadic tendency of teachers will not be overdeveloped by this opportunity. Let us hope that the teaching profession will not become more itinerant and weaken the schools further by a constant change of the teaching staff, that merely satisfies the desire for a change on the part of teachers.

A teacher must become a substantial member of the community in which he teaches to perform his function to that community most effectively. The plan of increasing salaries for continuous service will be more worth while as a means of retaining the staff when the market for teachers becomes more stabilized. The conditions of the past year are but temporary. We may look forward to the development of a well ordered and efficient teaching force for the American schools. The American schools need such a force above all other needs.

THE SUMMER VACATION.

There are numerous ways of spending the summer months. Some will travel in Europe. Others will work in the commercial or industrial fields. Still others will attend summer schools either as students or as teachers or both.

Whatever method one chooses of spending the vacation months, the fundamental necessity is that the occupation shall be in the nature of a diversion. It need not be considered as mere diversion, but it should be undertaken with the lightness of spirit and freedom from strain which characterize diversion.

We rest by change of occupation, not by ceasing to be active. Almost every large mercantile establishment will have teachers on the pay roll. Of course, the element of remuneration has its appeal. Perhaps some would say that this constitutes the desirable change for the teacher and hence may be regarded as a diversion.

At any rate, whatever the teacher does during the summer months, should contribute to his freshness of mind, vigor of action and joy of life. In this way the teacher will be able to return to his duties in the fall with a buoyancy of spirit and newness of life, and a wholesomeness of point of view, that will put snap and interest into his work. Here's hoping that the hot summer weeks may be so emphasized that the teacher will return to the schoolroom better teachers than they were last year.

CO-OPERATION NOT CONDEMNATION NEEDED.

The more closely the industrial work can be tied up with the regular school program, the better it will be for both.

There has been an attempt on the part of some to gain recognition for their work by condemning the regular school and its program. It has undoubtedly been open to severe criticism, but so has the industrial work. Success lies not in condemnation and antoganism, but in generous, constructive criticism and cooperation.

The academic school man must come to see that industrial education is a necessary part of every school program. The industrial and vocational advocate must come to understand that his work is only a part of the program and not the whole thing. There are critical times ahead for industrial education. It still has a defensible curriculum to build. It still has the problem to solve of efficient teaching. It still has waste to be eliminated. It will be under the necessity for some time to come of making complete justification for the comparatively large expenditures for its equipment and maintenance.

Instead of condemnation and criticism, let the industrial teachers cooperate in every possible way with the regular school program. Let them consider their work a part of the whole great scheme of education and offer every possible assistance in carrying it all to a final success. And let them see to it that their own work is so wisely planned and so efficiently executed, that no criticism can legitimately be cast their way.

In this direction lies success. In any other direction lies at least partial failure.

Work is not the curse nor the affliction that some people think it is. When taken in proper doses it is the best of medicine. It is now being prescribed for many forms of invalidism such as heart disease, Bright's disease, nervousness, and particularly for insanity. The lack of work is often the cause of many chronic maladies and it is a wise physician who can determine when one needs work instead of rest and in prescribing the remedy produce no unpleasant situations. About the most unhealthful person, as well as the most unhappy and useless, is the person with nothing to do.

Work is a dispeller of fears. It is the exercise that is as essential to the body and mind as are food and air. It is only when work is carried to excess that it becomes injurious, as in the case with food, rest and all good things.

The ideal of a healthy, happy life is no longer a world where work is not necessary and life is one grand sweet song of idleness. Life is activity; in the broad sense, it is work—work that produces and entails sacrifice. It is not less work that we need, but work in the right proportions and under the right conditions. Such work is health.

"One of the greatest things that can be produced in the child is the habit of service—doing something for somebody else besides himself. * * * He has been started right during the war, and, if we can perpetuate that thing, if we can show him that by being of service he is expressing what is after all the fundamental emblem of democracy, and that to be a citizen of a democracy carries with it not merely a benefit but a responsibility of service, we are doing the best possible thing to breed sound, faithful citizenship."—Livingston Farrand, Chairman, American Red Cross.

The Home Shop and the Manual Training Teacher

A few days previous to the Christmas holidays a manual training teacher visited the offices of the Industrial-Arts Magazine to renew his subscription and to exchange the greetings of the season. He was smoking a good cigar and wore that air of satisfaction which only follows an excellent meal. In the course of the conversation, it developed that he had just spent an hour with a prominent businessman, who had invited him to lunch to get his advice on the purchase of a kit of tools—a Christmas gift. The businessman recognized in the manual training teacher an expert in wood working, and availed himself of the latter's friendship to help in picking out tools for the home shop in which his boy was greatly interested.

The visit to the tool department of a large hardware store proved particularly instructive to the businessman who had never used tools himself. The man made the usual mistake of believing that his boy should have tools of boy-size and he was considerably impressed with the stand taken by the manual training teacher. The latter insisted upon selecting tools of the best trademarked brands, such as are used by experienced mechanics. The number finally bought was smaller than the businessman expected, but each tool was of the best quality, well adapted to average use in the home, and fully within the powers of the average muscular boy of 13 or 14 years of age.

The foregoing true incident is related here to point out to manual training teachers that they frequently miss an opportunity in not influencing boys to have a home kit of tools and to make this kit of the best possible quality. The educational and vocational influence of the school shop can be made doubly valuable, if it is reinforced by a home shop, in which the boy can apply the knowledge and skill acquired in school to home repairs and to work in which he is genuinely interested.

In this connection, it is interesting to see that the Junior Achievement Bureau of the Eastern States League is actively promoting boys' workshops to be established in the homes. The league recently issued a bulletin, prepared by Mr. Frank O. Kreager, assistant director, in which a series of eleven outfits for various home occupations is recommended. While the suggestions were originally made for Christmas, they are so helpful and so well adapted for all seasons of the year that we are reproducing them here with a few minor omissions.

Toys and Presents.

Each year American parents spend millions of dollars for toys for Christmas presents. By New Year's day, a large part of these toys are broken, and lie in the corner or the backyard. Why? Because of the destructive habits children have developed. And why these habits? Because, since birth, toys have cost the children nothing. Children, like grown-ups, value and form habits in proportion to the cost *to them.* They break up what costs them nothing, and cherish and keep repaired what they, themselves, have made or purchased with self-earned money.

A remedy can be found in developing the constructive rather than the destructive in children by buying them for Christmas working outfits and books of instruction with which they can make and repair things for themselves. In other words, buy tools, equipment and supplies rather than finished toys. Carlisle said, "Man without tools is nothing; man with tools is all."

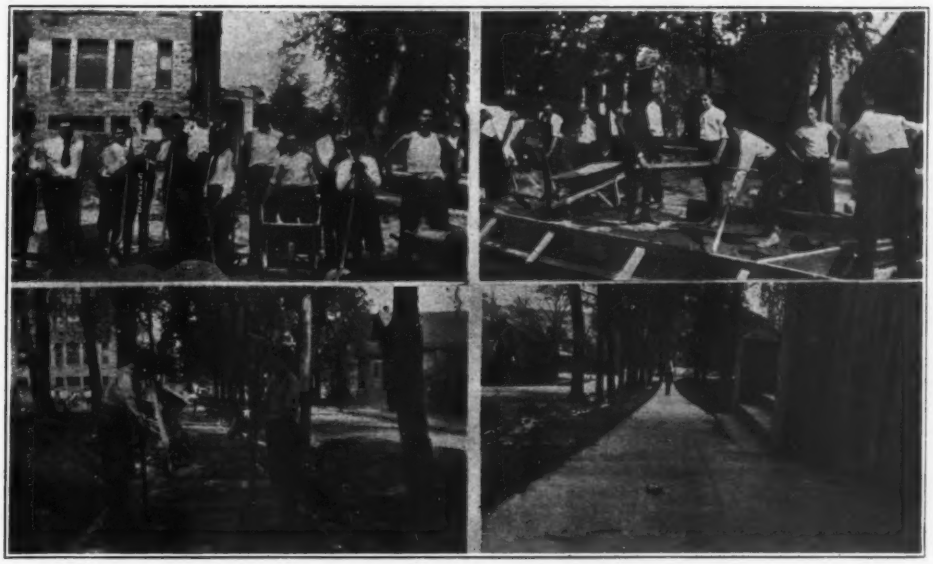
What to buy for each particular child depends upon the age and tendencies of the child and is a matter parents must determine for themselves. The important test is, "Is it something that the child can use and make things for himself, for others and for the home?"

The following are suggested outfits: In each case leave some part of the outfit for the children to make or buy from money they themselves have earned. In other words, cooperate with the children instead of doing it all for them.

Outfit No. 1, Paper and Cardboard Construction.

This outfit is very simple—scissors, glue or paste,

EXHIBIT OF WOODWORK, MANUAL TRAINING DEPARTMENT, CRYSTAL FALLS, MICH.
John Cassidy, Director.



A SCHOOL AND COMMUNITY PROJECT IN CEMENT.

A walk was needed along one side of the grounds of the Bellefonte, Pa., high school. The need was considered an opportunity for the Manual Training Department to work out a problem in cement construction. Under the direction of Mr. H. C. Menold, the boys worked out the levels for the walk and obtained the approval of the city engineer. They then proceeded to do the entire job from making the mixing boxes and preparing the forms and foundations to completing the final flooding of the surface finish. The illustrations show one of the mixing gangs and the completed walk.

ruler or measuring stick, pencil and some string, and a box to keep it in. It is especially suited to small children; with it and some instruction they can make animals and dolls, cardboard houses, furniture and toys. The total cost should not be more than one dollar.

Outfit No. 2, Coping Saw Work.

One coping saw frame.

A dozen saw blades.

A small awl.

A sloyd knife or a pocket knife, and a stone to keep it sharp.

Some sandpaper, glue, and string.

A block plane is a convenient, but not a necessary tool.

The material to be used is thin wood—cigar box wood or the veneer used for drawer bottoms.

A sawing board, to prevent marring the table, can be made from a board eight to twelve inches wide and eighteen to twenty-four inches long by boring an inch hole about two inches from the middle of one end and sawing a "V" shaped notch in the end to meet the hole. This may either be clamped to the table, or fitted with cleats in such a way that it slides on to the corner of the table. The sawing is to be done at the notch and hole which should project two or three inches beyond the edge of the table.

With the outfit all kinds of toys—animals, toy furniture, go-carts, jumping jacks, can be made, as well as a large number of useful household articles such as match boxes, trays, picture frames and mouse-traps.

This outfit without the block plane would cost from seventy-five cents to two dollars.

Outfit No. 3, Sheet Metal.

One soldering kit, consisting of soldering iron, soldering paste, emery cloth, scraper and solder.

A pair of tin snips.

Pliers.

A small iron vise.

A peen hammer.

The solder kit will contain instructions for its use.

Old tin cans form a never ending supply of material for this work.

The entire outfit should cost from five dollars to ten dollars.

Boys' Achievement Clubs have made with this simple equipment a very wide range of toys and useful kitchen and home articles such as bird houses, lanterns, ink-wells, chicken-feeders, nail-holders, cookie cutters, doughnut cutters, ash trays, light-houses, candle holders, scoops, blotter-pads, book-racks, match boxes sand-buckets bird-feeders, pen and pencil holders, desk sets, automobile arrow guides, shaving cups, water-wheels, and canteens.

Outfit No. 4, Bench Wood Work.

The following list, which would cost for good tools about twenty-five dollars, is a good one to start with:

1 cross cut saw.
1 rip saw.
1 claw hammer.
1 jack or smooth plane.
1 auger or one brace and a set of bits.
1 or 2 chisels.
1 screw driver.
1 try-square.

Other tools may be added later by the boy himself when he becomes more proficient with these. He can build his own work bench. A good temporary one can be made from a stout store box. A good tool chest can also be made from a box. Old store boxes offer an excellent supply of lumber if all nails are drawn out.

With this outfit, a boy can make himself generally useful about the house, and can build his own toys and equipment. Book-shelves, step-ladders, window-boxes, linen chests and ironing boards are a few of the many things that can be made with this set of tools.

Outfit No. 5, Picture Framing.

The chief item in this outfit is a picture frame mitre box and saw, which costs from $25 to $30. This is rather high for one child, but the cost becomes low in proportion when used by a large family, or a boys' and girls' club. With this framing box should be included a glass cutter and a cutting board (a perfectly straight bread board or drawing board will do), a hammer, screwdriver, some screws, nails, brads, and glue.

With such an outfit a boy or girl can frame pictures for the home or school in a very creditable way. Frame cases can also be made for collections of leaves, grasses, minerals or insects.

The picture molding can be bought from a dealer.

With the addition of a combination plane, costing about fifteen dollars, the boys can make their own picture molding.

Outfit No. 6, Shoe Repairing.

The iron standard, lasts, awl, knife, hammer, etc., can be bought as a complete outfit at almost any hardware store. The cost would be about three dollars.

With such an outfit the boy can half-sole and repair his own shoes, shoes of the family, and earn his pocket money by repairing shoes for others.

Outfit No. 7, Painting and Varnishing.

Four or five brushes, varying from one-quarter to three inches in width, some sandpaper, a steel scraper, paint remover, a putty knife, some putty, a can of crack-filler, bottle of turpentine, bottle of linseed oil, some small cans of ready mixed paint and varnish.

With this outfit the boy can keep the floors, standing woodwork and furniture of the home in first-class condition, re-paint his toys, and paint his own constructions.

If some gold and silver enamel are added, he can do some very creditable work in gilding picture frames. The entire outfit should cost about eight dollars.

Outfit No. 8, Sewing.

A work basket containing a supply of needles, scissors, tape, thimble and thread. For smaller girls a hand-operated sewing machine costing about six dollars, might be advisable,

The girl of twelve can learn to operate well the full-sized or regular sewing machine. Small girls should begin by making their own doll's clothes. Larger girls should be taught to mend and make simple clothing for themselves; a girl of eighteen should be able to make her own clothes.

Outfit No. 9, Millinery.

Milliner's glue, wire, buckram, shears, needles, thread and thimble, and pair of pliers. These may be secured at millinery shops. The equipment and supplies, to begin with, should not cost over five dollars. Take a few old hats apart carefully and find out how they are made. Girls should begin their work by making doll hats, and will soon be able to make their own.

Outfit No. 10, Leather Working.

One riveting set and a supply of glove clasps, one leather punch, shears, knife, a plate of smooth glass (window pane will do). Set of leather tooling tools.

Leather can be secured from a store handling art goods. With this outfit a very wide range of useful and ornamental articles can be made. This outfit should cost about five dollars.

Art leather work is especially adapted for self-expression and development of artistic children.

Outfit No. 11. Art Metal Work.

For children artistically inclined a metal working equipment is especially desirable. Many beautiful and useful articles can be made from a simple equipment consisting of a ball peen hammer, a steel block or anvil to hammer on, a metal saw, a pair of tin snips, a metal drill, and a supply of sheet brass and copper, and copper wire and rivets. For raised work, such as vases, special anvils or stakes are needed.

With a brazing outfit, this work can easily be developed into craft jewelry.

As a means of supplementing any home shop outfits Mr. Kreager suggests that at least one book relating to the particular type of occupation undertaken accompany the gift of the actual tools. He recommends the following list as particularly helpful:

Home Achievement Library.

The following is a partial list of the books suitable for the Children's Home Achievement Library. At least one book should be selected for each of the foregoing outfits.

Buxton & Curran's Paper & Cardboard Construction (Manual Arts Press, $1.50).
Johnson's Toys and Toymaking (Longmans, $1.60).
Polkinghorne's Toymaking in School and Home (Stokes, $3.50).
Worst's Industrial Work for Middle Grades (Bruce Publishing Co., $3.50).
Thatcher's Simple Soldering, Hard and Soft (Spon & Chamberlain, 75 cts.).
Adams' Carpentry for Beginners (Moffat, Yard & Co., $1.50).
Collins' Amateur Mechanic (Appleton, $1.50).
Zerbe's Practical Mechanics for Boys (N. Y. Book Co., 75 cts.).
Beard's Shelters, Shacks and Shanties (Scribner, $1.75).
Zerbe's Carpentry for Boys (N. Y. Book Co., 75 cts.).
Goldsmith's Practical Things with Simple Tools (Geo. Sully Co., 75 cts.).
Hall's Carpentry and Mechanics for Boys (Lothrop, Lee & Sheppard, $2.50).
Collins' The Book of Electricity (Appleton, $1.50).
Hall's The Boy Craftsman (Lothrop, Lee & Sheppard, $2.50).
Hasluck's Mounting and Framing Pictures (Cassell & Co., $1.00).
Nichols' The Building of a Shoe (Nichols, $2.00).
Galloway's Staining, Varnishing and Enameling (The Trade Papers Publishing Co.).
Hasluck's Boot Making and Mending (Hasluck).
Everybody's Paint Book (M. T. Richardson & Co.).
Beard's American Girl's Handy Book (Scribner, $1.00).
Paret's Harper's Handy Book for Girls (Harper, $1.00).
Hall & Perkin's Handicraft for Handy Girls (Lothrop, Lee & Sheppard, $2.50).
Goodwin's Home Course in Sewing (Beatty, 50 cts. and 60 cts. a volume).
Laughlin's Complete Dressmaker (Appleton, $1.75).
Reeve's Practical Home Millinery (Longman).
Bottomley's Practical Millinery (Illustrated Milliner Company, $1.25).
Mickel's Leather Work (Manual Arts Press, 75 cts.).
Carter's Artistic Leather Work (Spon).
Rose & Cirino's Jewelry Making and Design (Metal Crafts Pub. Co., $6.00).
Rose's Copper Work (Metal Crafts Pub. Co., $2.00).
Payne's Art Metal Work with Inexpensive Equipment (Manual Arts Press, $2.25).
The Boy Mechanic (Popular Mechanics Co., $2.00).

Dolls designed and made by high school art class under the direction of Miss Malcolm Huff.

THE FARM PROJECT AS A HOME IMPROVER.

Oliver F. Kilham, Newberg High School,
Newberg, Ore.

How are we to keep the worth-while boys and girls on the farm? This question has been a serious one in this country for a number of years; and our recent census figures would appear to indicate that it is to be an intensely vital problem in the immediate future. How are we to get wide-awake, rural-minded young folk of all classes to incline toward farming? The Smith-Hughes project may be used in at least one way as an instrument for good along this line.

Since I first entered an agricultural college back in 1902, it seems to me that the main stress has always been put on the ideas involved when we say "the home project as a farm improver." And who shall say that the farm has not been improved, and improved, and improved? And is it not true that this has been done more often than not to the utter blotting out of the idea involved when we say "the farm project as a home improver"?

The business of the merchant, the lawyer, the plumber and innumerable others is, in nearly every case, his home improver. It provides the money that in turn is invested in modern improvements of all kinds in and around the home, of which the house is a part. These men admit that to have these socalled "better things in life" is one of their principal aims in carrying on their business.

But what of the farmer? His business has, in too many cases, been carried on at the expense of his home, rather than for the sake of its improvement. We can go into some of the most prosperous farming communities in the country, and on a farm with big red barns bursting with food and comfort for the farm animals, find a small, poorly built, poorly arranged, cheerless house—and no home.

To have a home we need not necessarily have a big house; but we should have a house that shows some sign of good taste in the building. We should have a well-arranged house, with plenty of light, running water, electric lights, modern bathing facilities, if possible,—in short, whether we have the things mentioned or not, we should have the things that make for convenience, labor saving and comfort.

And mind you, not the things the older generation feel are needed for comfort and for right living, but rather the things that are demanded by the younger generation. Of course, it is understood that there are times when the farmer's pocketbook will not stand the strain of such improvements. If such be the case, then let him beware of providing sumptuously for farm needs. Right here lies the primary reason for the exodus from farms to farmer-towns.

A recent survey in Missouri where 645 farms were taken at random, gave the following:

Only 55 had modern lighting systems.
Only 62 had indoor water supply.
Only 37 had modern sanitation.
Only 40 had up-to-date ironing equipment.
Only 34 had a bread mixer.

And of these 645 farms, 407, or 63 per cent were owned by their managers. And of these owners, 55 per cent owned one or more automobiles. Only 62, or 11 per cent, had an indoor water supply. Women carrying water!

In the December, 1920, number of the Pacific Homestead, the editor, Mr. Carle Abrams, said: "Let us pay more attention to modernizing the farm home. If nothing else, it will prove one of the most important factors in keeping the children from leaving the farm for the city, where such conveniences are to be had.

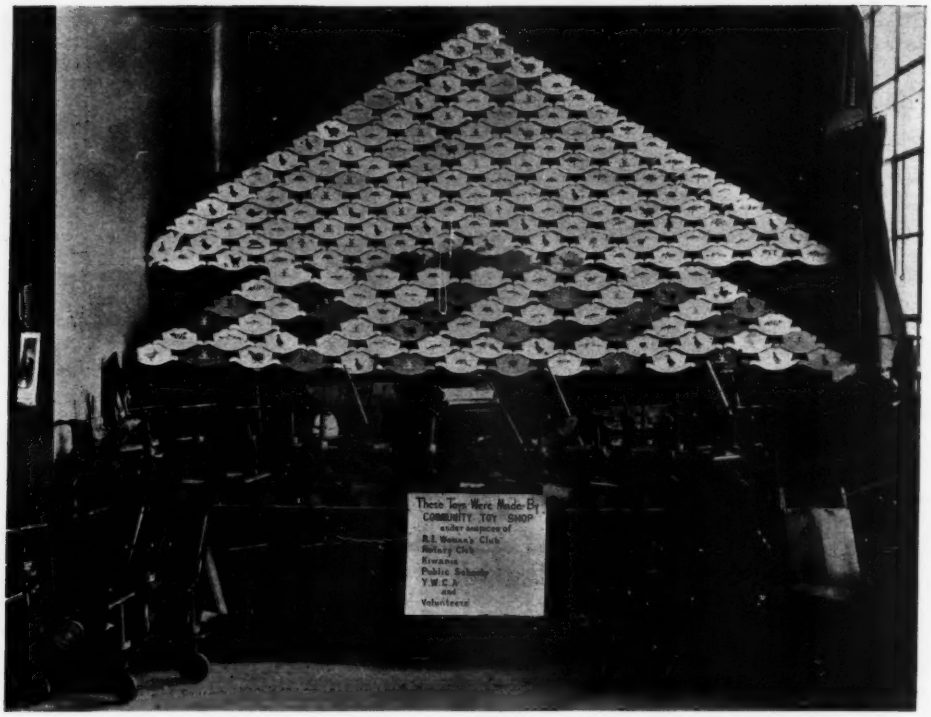
Young people do not dislike farming. Anyone who says so does not know them. They take the keenest delight in everything that the farm stands for except drudgery and neglect. They certainly do not like the penuriousness that causes them to live for ten or twenty years in the same house, with the same lack of comfort that existed when they were two or three years of age, and their parents were just getting a start.

One of the greatest incentives to civic pride and civic improvement is pride in the home and improvement, as the days go by, of all that appertains to it. It goes almost without saying, then, that the home improvement work—the work that by its results has given the desire for civic improvement—also has distinct and measurable economic or money value.

We all know how land tile drained will add to the inventory of tillable acreage, and we all know that a newly built barn may constitute a permanent improvement that will add to the farm value out of proportion to the amount expended for such improvement. Artificial irrigation often gives an increase in crop production, and consequently in net income and value of property, far in excess of what might be expected from the initial cost of installation.

Improvements in the house, such as devices for labor saving, for comfort, and for beauty, pay just as truly as improvements on any other part of the farm. Improvements on the grounds, especially about the house, and judicious planting of trees, shrubs and flowers, will mean continual increase in property valuation as the years go by. A home property built for $12,500 later sold for $20,000, solely because of careful landscape plantings. A better property, 200 feet away, costing originally $14,000, was offered for $12,500, and the offer was refused, because the purchasers wanted a home, and the other

EXHIBIT OF MANUAL TRAINING PRODUCTS OF THE HIGH SCHOOL, IRON RIVER, MICH.



Toys made in the Rock Island, Ill., schools by manual training classes for charitable use.
Mr. A. W. James, Director.

"looked too much like a barn." The sale was made entirely on the strength of the fact that the home grounds surrounding the property were beautifuly laid out in every way.

Mr. John Watson, secretary of the American Association of Nurserymen, has suggested the following for use in this connection. Take a man who has built a $20,000 house. He would probably spend at least $10,000 for the furnishing of the inside of that house. Such a man, Mr. Watson says, as a rule will spend about $2,000 on outside plantings. He uses the place twenty years and then sells. His inside furnishings have a selling value of not more than $5,000, while all things considered, the outside plantings will have increased in value from $2,000 to in the neighborhood of $10,000 and both have been used and enjoyed for the greater part of twenty years.

It has been found in Newberg that pushing the Smith-Hughes project as a home improver has created in the boy a very keen interest and response. The home, the boy feels, is just about as much his as Dad's, and he takes pride in making it a better one. The farm—all theories to the contrary notwithstanding—is Dad's. The boy knows it, his Dad knows it, you know it, we all know it. There is no way of getting away from it. In the farm, aside from the home, the boy has never had that sense of proprietorship that is so necessary to interest and enthusiasm.

Let no one get the idea that we ignore the project possibilities as a farm improver, for such is not the case. But we have found that thru an agency like the Newberg Farmers' Club, for instance, we can often reach and help the adult farmer far more efficiently than is possible thru a pupil's project. Personally, I do not believe in making the boy's Smith-Hughes project the pack-horse for all the enlightening and reformation material the United States Department of Agriculture plans to get to the farmer.

There is also a certain psychology entering in right here that must be considered. We are all human, as it happens, and no adult, particularly the farmer adult, enjoys being instructed by one years younger than he, even tho it be his own child. Rightly or wrongly, many adults feel a certain loss of self satisfaction and of prestige thru the process. Let the boy do the very best he knows how with his project. Let him show a becoming modesty concerning his knowledge that will be suited to his years. Let him display his superior methods, if he has any, without the blare of trumpets and the call of the crier. Then let all of us who are in Smith-Hughes teaching work, keep in mind the fact that the farmer can take or leave as he sees fit.

Let us all remember how little we know and how much the practical farmer knows. Such an attitude will mean power for our boys; the heartiest cooperation from the farmer; success for our Smith-Hughes work; and increasing knowledge and understanding for all of us.

So shall we help to make the farmer class the greatest power for good among the social classes. So shall we contribute toward ever increasing prosperity in community, county, state and nation.—Salem, Ore., News-Item.

Forestry Lessons on Home Woodlands. Wilbur R. Mattoon and Alvin Dille. Bulletin 863, 1920, U. S. Department of Agriculture, Washington. The pamphlet outlines lessons which present the subject from the standpoint of the important local kinds of forest trees and their uses, the location of woodlands on the farm, the different timber products, the utilization of timber, protection and improvement of woodlands, and the planting of young timber. It takes up in detail a study of illustrative material, home projects, and marketing farm timber.

Utilization of Black Walnut. By Warren D. Brush. Bulletin 909, 1921, U. S. Department of Agriculture, Washington. For the past six years there has been a revival in the walnut-furniture industry and large amounts of the wood have been called for. The bulletin which is beautifully illustrated with the different species of the wood, deals with its characteristics, properties, uses, manufacture and market value. The pamphlet contains a production map of the United States, a table of properties actual and comparative, and one of production by states.

INDUSTRIAL ART—A PEACE EMERGENCY*

Richard F. Bach, the Metropolitan Museum of Art, New York, N. Y.

We speak of morale in the open fighting field, we count upon the morale of those at home in the service of production and supply, yet we have never realized that this term must be applied to every line of effort that engages our minds and hands if the national cause is to be served—even to the arts of peace upon which the country must so largely depend in regaining its equilibrium and normal course of life now that the job over there is done. Have we ever considered the meaning of morale in the fine arts? In the maintenance of the fabric of national art impulse, in satisfaction, poise and peace of mind, the industrial arts serve among the greatest agencies of national progress; theirs is a serious undertaking, to maintain morale in the face of almost impossible conditions, not only as to labor and material, but as to design and taste.

For the first time, during the war, the industrial arts manufacturing fields clearly saw that their own shortsightedness had brought them a most serious handicap. The machine had faithfully served them for many years, so faithfully indeed had it wrought their many forms and weaves that its owners had all but forgotten that the mechanism had no thoughts of its own. The war isolated the United States and we counted among our resources machines galore, fine raw materials, excellent technical ability, but no designers and inadequate schools to produce others to make good the shortage due to the occupation of Europeans in duties of belligerency. True values thus demonstrated the real position of the machine, not as a thinking automaton, but as a glorified tool which might be misused as readily as correctly applied. Manufacturers who had long had ugly presentiments as to what might happen if their industries should ever be isolated from European sources of supply as to design and taste, saw that the day had come too soon. They had never advanced any educational propaganda, they had helped to found no schools, they had seen for many years only the advantages of the present, they had not built for the future of American industrial art. While an American harvesting machine was a prize for the European, an American industrial art object, with few exceptions, remained little more than a near-barbaric curiosity.

But even yet the industrial arts manufacturers, the furniture and furnishing producers, have not made direct and general use of some of the most obvious and most immediately available advantages that could be offered to any branch of production. To be sure they have their problems of obtaining material, of holding labor to turn this over into executed pieces, and, just now, chiefly of persuading middlemen to buy. But what has the manufacturer done in the field of design? Has he reached out for every possible avenue of assistance in the most important field of all, namely, that of improving the appearance and appeal of his pieces so that he may prove the calibre of his designers? Has he considered the value of the possible trade mark: *Designed and made in the United States?* And finally, in the absence of schools for craftsmen—the woeful lack of which the war so plainly showed—has he made the museum collections in our great cities a part of his working plant? Has he ever calculated the asset value of the museum in his city as an inspiration, as a source of information for design and actual models, as a center for study and research, in short, as an out-and-out working laboratory? It is safe to say that such a conception of the museum's function is a novel one from the average manufacturer's point of view. Now is the time for him to discover what the great collections throughout the country have to offer, what extensive arrangements have been made in the large museums to provide or make accessible the fine examples of the craftsmanship of other days. Now is his time to begin in a thorough-going way to make himself acquainted with the contents of these great galleries, with the finely organized resources for study—golden opportunities for his de-

*From the Bulletin of The Metropolitan Museum of Art.

A corner of the studio in the Florence (Italy) Trade School, where the students are making plaster casts. Many of the boys at this school lived by begging and stealing before this school opened its doors to them. Now they are given an opportunity to learn and practice arts and crafts. Ten of these Italian boys are supported by the members of the American Junior Red Cross.

signers. There is but one demand upon his time, that of going to the museum; books he may have in his own office library, but the great collections of originals from which to inspire and model offer the resources of contour, color and depth which the finest engraving and measured drawing can but remotely suggest.

We can only repeat, there is nothing "highfalutin" about a museum. There is nothing difficult or far-fetched about an exhibition of originals. To be sure, they cannot be handled, they are housed in a splendid architectural monument worthy of them, they must be under guard, and they must be perhaps in a structure located in a public park requiring a ten-minute trolley ride. But does all this mean that their great value must be ignored? Glass cases and guardians are unfortunate necessities, but so are the locks on our doors safeguards to guarantee the continued value of objects within. It is the duty of all concerned with the industrial arts, but especially of those engaged in their manufacture and sale, to acquaint themselves with and make constant use of every facility which may improve American design, and the museum collection is the foremost of these facilities at the present time. Furthermore, the museum is bound to remain the foremost of these facilities for the reason that without its resources even the schools cannot perform.

Hitherto manufacturers have rarely seen the value of taste as an asset; they have regarded their factory merely as a business venture, not as a workbench of national taste. They have not realized that every chair or lighting fixture or tile or yard of goods is a factor in the great mosaic of national culture in the industrial arts. The museum stands ready to help them to a better understanding, not as a patron, not as a big brother, but as a partner in progress. Splendid things have been brought together and made available, lending collections have been prepared, photographs are available, large access may be had to the finest facilities in the way of fundamental inspiration and sympathetic help that ever have been extended to craftsmen and designers and manufacturers. These resources are ready to use, there is no red tape, there is no air of "institutionalism" and awe; there is only the desire to cooperate, to help, for the museum cherishes the highest ideals for the advance of American design. The museum maintains that "good enough" is no slogan for American manufacturers in the industrial arts. The museum maintains that *Made in America* on an object of furniture or furnishings is inadequate unless it also connotes *designed by an American-trained artist*. Above all, the museum has watched the growth of public taste among us, it has seen this taste gradually gain headway and outstrip the design quality of the manufacturer's output, and it has seen many a manufacturer make the discovery that what is easiest to get is not the best.

What will the manufacturer do to assure the progress of America along steady lines of cultural growth? Will he persist in the all-for-business course of quick turnover, or will he bend every effort to achieve the finest design the world has ever seen, because for America only the best is good enough? Like many others whom the course of events has taken aback, the manufacturers had learned that preparedness is the longest word in the dictionary, but it is not too late for him to make a bold effort to profit by the present situation of the United States in the industrial arts. A direct aid is offered him in the Metropolitan Museum. An immediate effort can be and surely must be made to establish Americanism in design, to achieve that new craftsmanship which shall form part of the cultural heritage of the United States. There is no time like the present to take stock of facilities to hand.

THE CRATE CORNER.

The corner of the ordinary crate is its weakest part. With this fact in mind the U. S. Forest Products Laboratory, Madison, Wis., has made a series of tests to develop effective arrangement of members and nailing or bolting. Teachers in manual training will be interested in the findings of the laboratory in that they will be helpful in a study of butt joints.

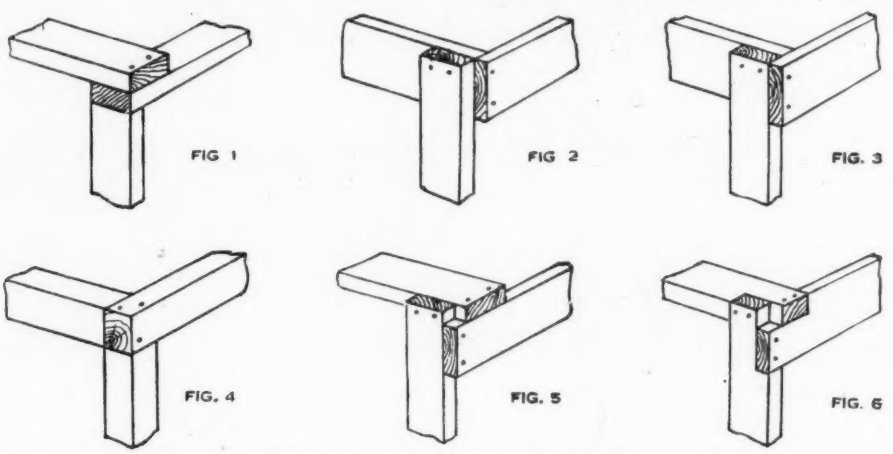
An example of inexpert crating frequently met with is that shown in figure 1. This construction is poor because the nails holding one member are driven into end grain and so have comparatively low holding power. Another common example of the same fault is shown in figure 2. This construction may be improved (fig. 3) by lengthening the member to permit nailing into the side grain.

The corner construction shown in figure 4 is very weak, because the only nailing possible is through one member into the end grain of the other two. This style of corner is frequently used in crates which are to be entirely covered with sheathing. In a crate without sheathing it would, of course, be worthless.

In figure 5 each member is nailed to another member and has the third member nailed to it. This is a very effective arrangement. It is called the "3-way" corner, and the distinguishing feature is that each member is held by nails or bolts in two directions. Figure 6 is suggestive of further variations of the 3-way principle, with the members notched together.

Seldom if ever does the 3-way corner construction increase the volume of the crate. On the contrary it usually reduces the space occupied. When properly nailed or bolted, this type of corner has a considerable bracing effect, although it does not do away with the need for diagonal bracing.

The sixteen possible arrangements of members at a 3-way corner are given in figure 7. It will be seen that



Figs. 1—6. Types of butt joint construction adapted to crate and box making.

A and 1 are the most practical when the object to be crated is a boxlike form, such as a filing case. When the object is of irregular form, such as an electric motor, one of the other arrangements may have the advantage of permitting better bracing and blocking.

Proper arrangement of members will not in itself produce a good corner. They must be properly fastened together. Whether bolts or nails should be used depends principally on (1) the thickness of the members, (2) the amount of stiffening afforded by sheathing, and (3) labor costs.

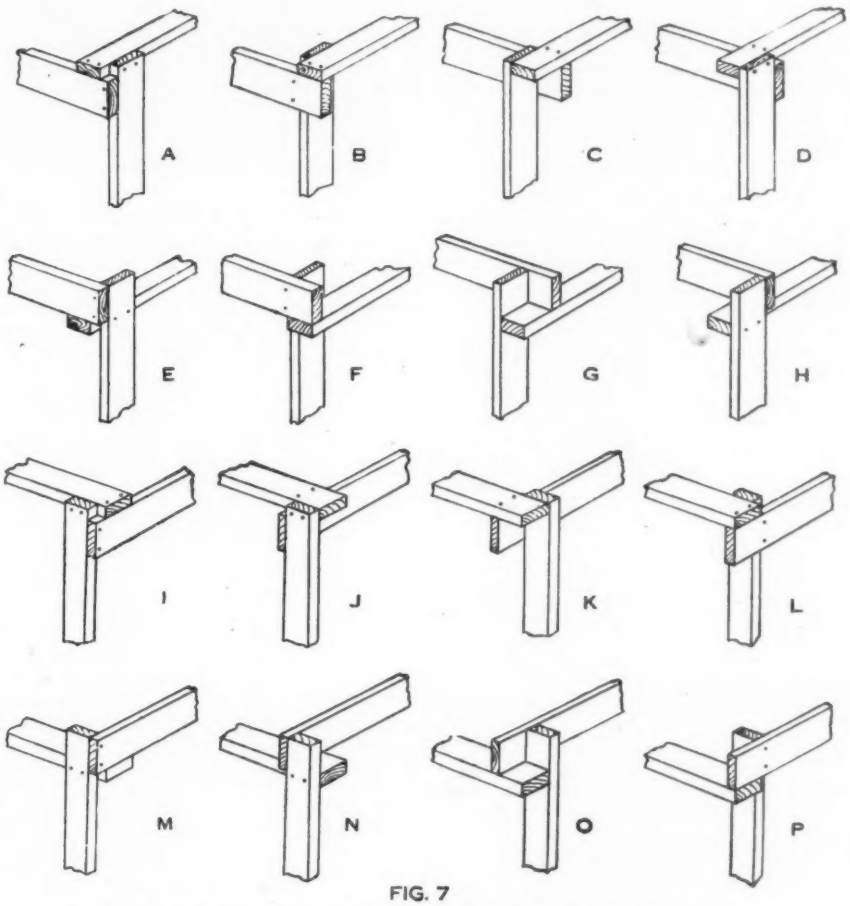


FIG. 7

Fig. 7. Sixteen variations of the butt joint as adapted to crate construction.

Nailing.

Nails driven in holes slightly (1/32 to 1/16 inch) smaller than their diameter have considerably more resistance both to direct pull and to shear than nails driven without holes.

Cement coated nails are superior to uncoated nails.

Length of nails should be somewhat more than twice the thickness of the member holding the heads.

Slender nails are likely to hold better than thick nails under the repeated shocks and constant weaving action to which crates are subjected, because the slender nail bends near the surface of the pieces joined without loosening the friction grip towards the point.

Number of Nails or bolts joining one member to any other member should not be less than two. Usually as many nails as can be driven without splitting should be used.

Danger of splitting will be reduced if nails are staggered. Boring holes for nails also reduces the danger of splitting.

Bolting.

Bolts have the advantage of holding after the friction grip of the wood on the shank is destroyed. The following schedule of bolt sizes is suggested as a guide:

Thickness of crate members	Diameter of bolts
Up to 1½ inches	⅜ inches
1½ to 3 inches	½ inch
3 to 5 inches	⅝ inch

Machine bolts should have washers and the heads should be countersunk.

Carriage bolts are preferred to machine bolts and may be used without washers under their heads.

Nuts should if possible be on the inner side.

Locknuts should be used on all bolts; or, if there is no expectation of using the crate a second time, the threads may be deformed to prevent loosening of nuts.

Holes for bolts should be bored to the same diameter as the bolts—or 1/32 inch smaller.

PROBLEMS AND PROJECTS

The Department of Problems and Projects aims to present each month a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration. The editors will not accept the old hackneyed problems of footstools, taborets, towel holders, etc., which have been made from time immemorial, ad nauseum.

Drawings and manuscripts should be addressed: The Editors, INDUSTRIAL-ARTS MAGAZINE, Milwaukee, Wis.

A MODEL RACING AUTOMOBILE.

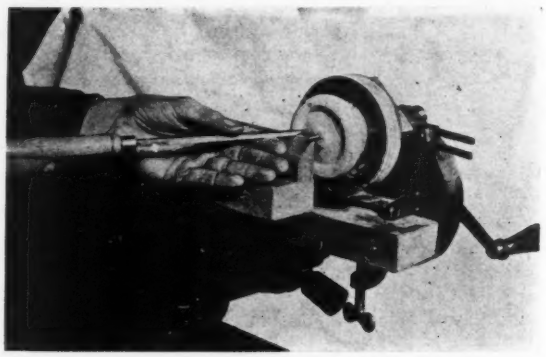
Benjamin Baumritter, New York, N. Y.

Here is a problem, which, like the well known projects of the electrical motor, telegraph outfit, model yacht, etc., gives the boy an opportunity to become familiar with some of the processes in the field of metal work, sheet-iron work, electricity, and wood turning.

At first glance, it might seem that this would be a difficult problem for a class of twenty pupils in a woodworking shop that has no special equipment. It will be, unless every step, every operation is carefully planned and well organized by the teacher from lesson to lesson. With two pair of snips, one soldering iron, one small emery grinder comprising our special equipment, this automobile was constructed, with every boy in the class, busy all the time and perfectly happy.

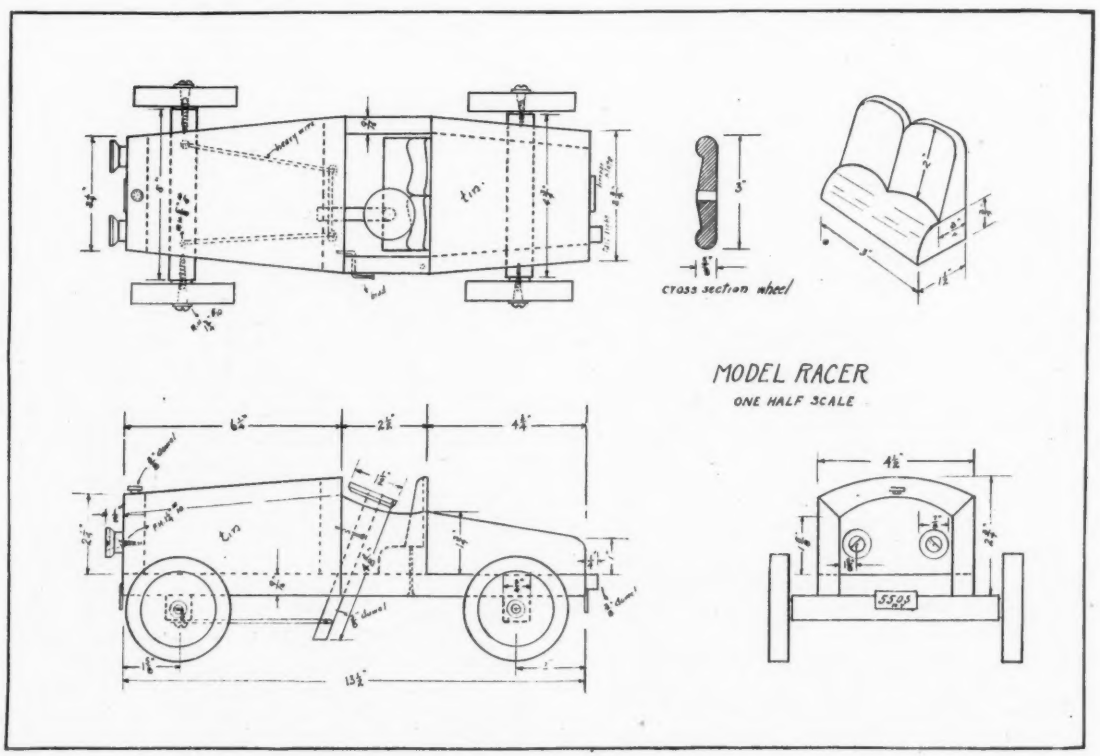
The very first lesson should be a demonstration of preparing the wood and turning out of the wheels. It is a long drawn out operation to make enough wheels for a large class, and therefore must be started at once. The second lesson might be how to prepare the tin cans (olive oil cans, we found, were the best) brought in by the boys for building up the hood and the back. The third lesson, a preparation of the wood parts. And so on.

In the cut it will be seen that the stone of the grinder is replaced by a circular piece of wood fastened by screws to another block of wood with a 1¼″ number 10 flat head screw in the center to act as a face plate on which the wheels are turned. A 3/16″ hole is bored in the block intended for the wheel. Before mounting the block should be back sawed as nearly round as possible. The entire jig is set up in the vise, and a tool rest made of two blocks of wood, as shown in the picture. An ordinary ¼″ chisel ground down to a round nose shape, may be conveniently used.

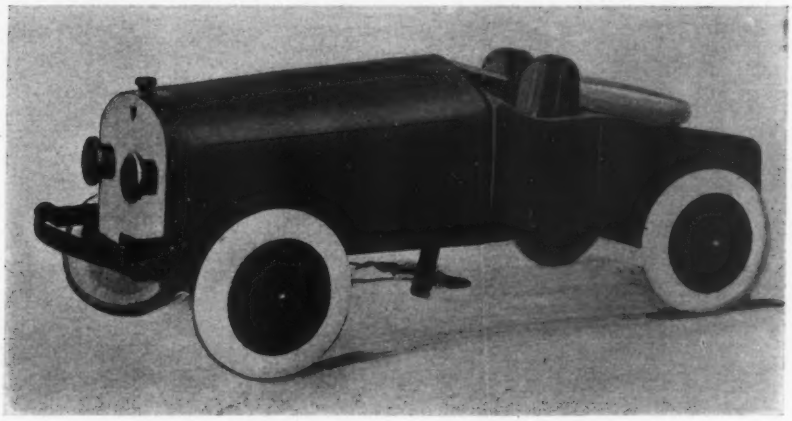


METHOD OF TURNING WHEELS FOR TOYS.

This model has proven to be by far the most popular of all toys, as well as the least expensive. The headlights are the ends of spools, gilded. (Small electric flash-light bulbs controlled by a switch at the steering wheel, makes



DETAILS OF TOY AUTOMOBILE.



TOY AUTOMOBILE MADE IN MR. BAUMRITTER'S CLASS.

a fine problem in electricity, and add a touch of realism to the problem.) The bumpers are also made of tin. And the better and faster workers may equip their automobiles with mud guards and running boards.

The combination of colors on the cars is limitless. It was found practical, however, to limit the boys to three colors only. One color for the seating space, one for the body proper, and one for the disc wheels. The tires are painted grayish white. One coat of undercoater and one coat of enamel were found to be sufficient. The lines on the hood are optional and may be put on with a pen and ruler and black India ink. The license plate number is done with pen and India ink.

The cost to each boy for washers and paint was in the neighborhood of ten cents.

A COOPERATIVE PLAN.

J. A. McKinley, Instructor in Mechanical Drawing and H. Stannard, Instructor in Woodwork, Industrial Arts School, Mount Vernon, N. Y.

This problem is a real piece of furniture, not a problem or an exercise. It was made by an eighth grade boy and we consider it a fine example of cooperation between the drawing room and the woodworking shop. It is presented as an advanced problem in cabinet making and should not be attempted by students who have not had considerable woodworking experience.

The student's account of the work is as follows:

When I was in Grade seven my brother was in need of a combination desk, wardrobe and bureau. He asked me whether I could make one for him in school and I said yes, I would make one for him. I had a catalog at home that contained illustrations of chifforobes from which we got an idea. I asked the drawing teacher if I could make a drawing of one and he said "Go ahead and make one."

First I made a small sketch on which I marked all the general dimensions. When this was finished I made a half-size drawing. The scale was 6″-1′. The size of the drawing was 4′ x 5′ 8″.

When the drawing was finished I showed it to the shop instructor and he said, "If you buy the lumber you can go ahead and make it."

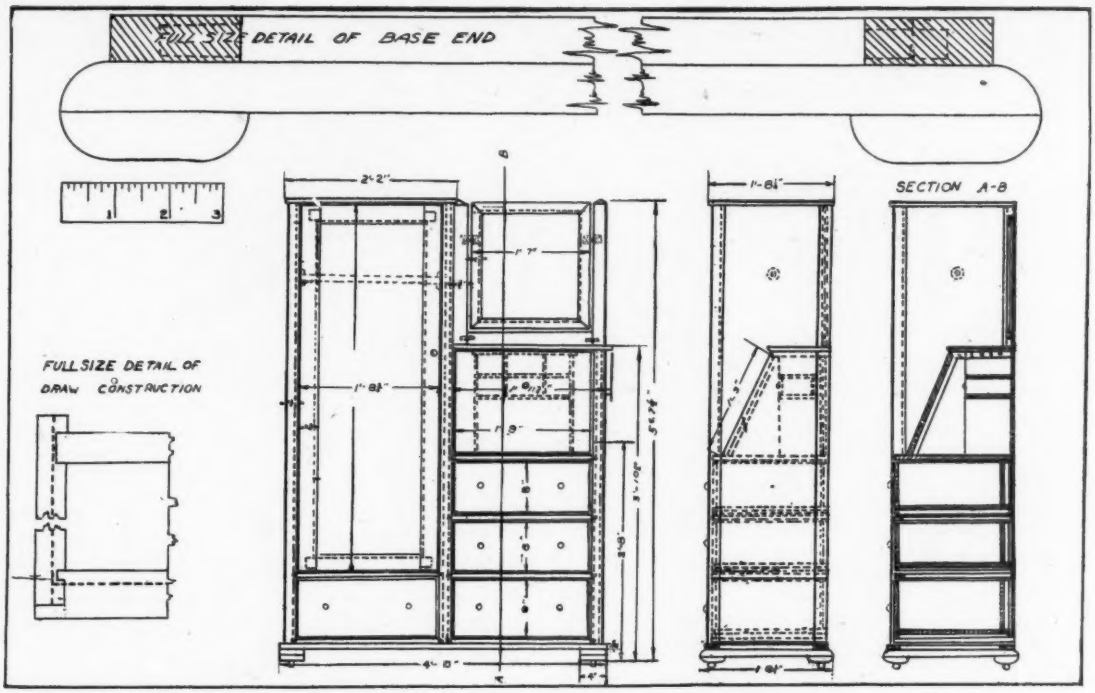
I bought the lumber and started to make it. It took me about three months to make it working only three hours a day. The rest of the day I studied history, arithmetic, English, mechanical drawing and science.

I used two kinds of wood, quartered oak and whitewood. The first thing I did was to glue up the two sides and center sections. Then I glued up the top piece of the wardrobe and the front part of the desk. The top piece of the desk was made next, and the legs and frame for the base and frames for the drawer slides were the last parts made. It was now ready for assembling.

On the side pieces and the center piece I put corner posts which were dadoed $\frac{3}{4}$″ wide and $\frac{1}{2}$″ deep. The side panels and the center panel were then glued in. Next I put in the cross pieces and made the wardrobe door, using $\frac{1}{2}$″ panel and $\frac{7}{8}$″ frames. After that I made the drawer fronts of oak and the drawers and pigeon hole partitions of whitewood with oak edges. The mirror frame was made of oak. I bought glass knobs for the drawers and the door, two locks for the wardrobe door, the desk and the drawer, escutcheons for the four drawers, the door and the desk front, and four steel castors.

After the job was assembled, I stained the whole with golden oak stain. To fill up all the pores in the wood I applied filler, after which I gave it three coats of shellac allowing it to set 24 hours between each coat. When the shellac was thoroughly dry, four coats of varnish were applied, allowing it to set 48 hours between each coat. After the varnish had dried I rubbed it down with pumice and oil and waxed it. I then put my glass knob and escutcheons in place and the job was finished.

COMBINATION DESK AND WARDROBE.



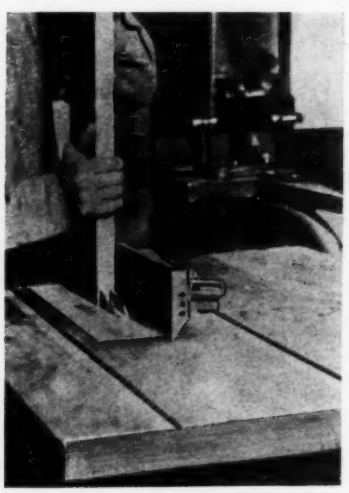
DETAILS OF COMBINATION DESK AND WARDROBE.

A "HOME MADE" TENONER.

Charles Frost, Philipsburg, Mont.

The accompanying photograph shows a tenoning machine, made from a pair of dado saws, with a babbitt metal washer between them on the saw arbor, used on a common circular saw.

The use of this device permits sawing both sides of a tenon at one operation, and with but one adjustment of the ripping fence.



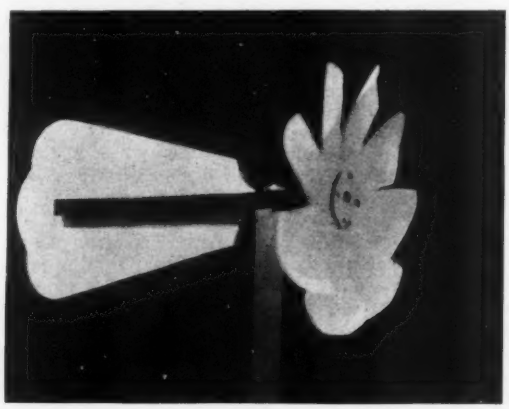
THE TENONER IN USE.

This saves a great deal of labor as most workmen spend more time adjusting their machines than in actually sawing joints when working upon the usual run of manual training and small cabinet problems.

THE WIND WHEEL.

C. E. Newell.

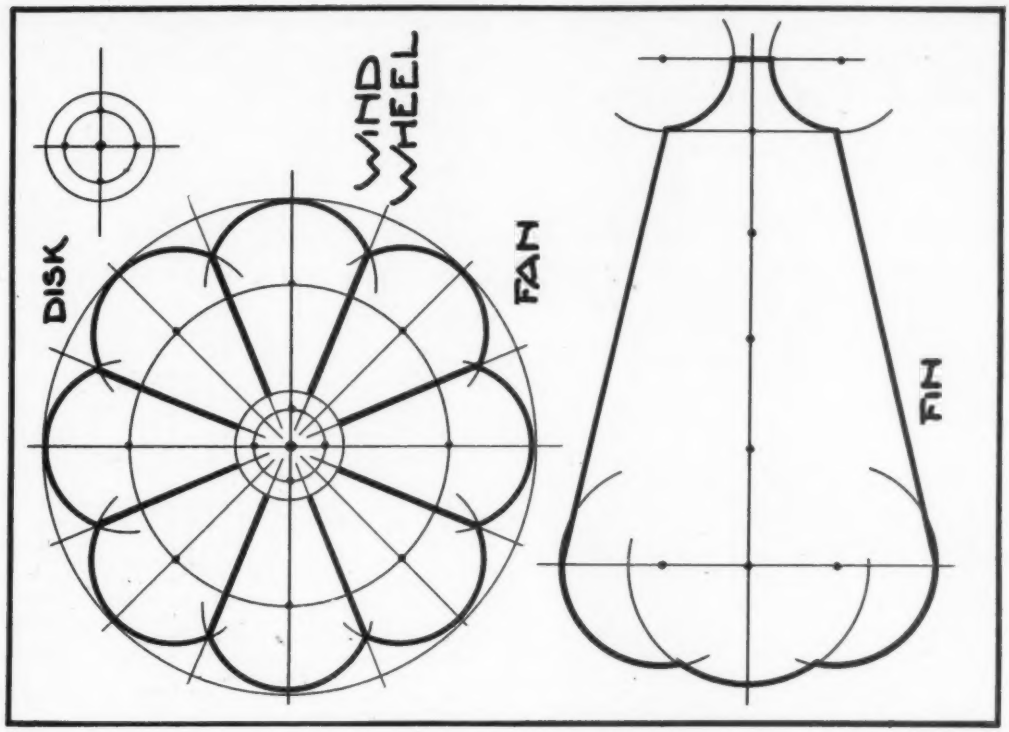
Problems involving the use of thin wood and metal are sometimes skeptically approached by experienced teachers. It is, however, gratifying and reassuring to report that teachers and classes are quite wedded to this type of hand work after once completing such a problem as the making of a wind wheel.



COMPLETED WIND WHEEL.

The following materials are needed for each wind wheel: one soft wood stick $\frac{7}{8}$" x $\frac{7}{8}$" x 36"; one stick $\frac{1}{2}$" x $\frac{1}{2}$" x 10"; one piece thin metal 7" x 7"; one piece thin metal $5\frac{1}{2}$" x 9"; two iron burrs No. 6; four No. 5 Crown round head paper fasteners; one 1" No. 7 round head blued wood screw; one $1\frac{1}{4}$" No. 7 round head blued wood screw; five $\frac{3}{8}$" No. 20 wire nails; one-eighth sheet No. $1\frac{1}{2}$ sand paper.

The wood may be ordered cut to size or it may be cut in the classroom using the sizes given. Pine, basswood or white-wood may be used. The sticks may be cut from the clear stock selected from boxes, packing cases or crates. The thin metal is best procured from sheets of No. 38 tagger's iron. Sheets of this metal 24" x 38" in



DETAILS OF WIND WHEEL.

size retail for between twenty and thirty cents each. Thin metal cut from discarded tin boxes and cans may be used where the tagger's iron can not be procured. The No. 38 tagger's iron admits of being readily cut with ordinary four inch scissors.

The wind wheel calls for the drawing of two patterns; one for the wheel or fan and one for the tail or fin. By referring to the accompanying plate one may readily draw the patterns using the dimensions as stated.

The Fan: great circle $3\frac{1}{2}''$ R; second circle $2\frac{1}{8}''$ R; third circle $\frac{3}{4}''$ R; small circle $\frac{1}{4}''$ R. Use $1\frac{3}{8}''$ R to divide the great circle into sixteen equal parts and to draw eight arcs at the ends of the diameters. Draw the patterns for two $1\frac{1}{2}''$ discs $\frac{3}{4}''$ R; place for punch points $\frac{1}{4}''$ inside the circle.

The Fin: length 9″; greatest width $5\frac{1}{2}''$ x $1\frac{3}{4}''$ from one end; second width $2\frac{1}{4}''$ x $\frac{7}{8}''$ from second end which is $\frac{1}{4}''$ wide. Use $\frac{7}{8}''$ R to describe arcs on narrow end of fin. Use $1\frac{1}{4}''$ R and $1\frac{3}{4}''$ R to describe arcs on wide end of fin. Place four punch points on long diameter of pattern $1\frac{1}{2}''$ apart. These points locate places at which to nail fin to $\frac{1}{2}''$ x $\frac{1}{2}''$ x 10″ stick.

Cut the paper patterns $\frac{1}{4}''$ outside the lines and fasten them to the metal by means of patches of paste. Cut the metal to the shape of the fin pattern and sand the edges of the metal. Cut the metal to the shape of the fan pattern by first cutting out the great circle, second cutting the radii of the fan, third cutting the arcs at the ends of the fan sections. Sand the edges of the metal. Cut the two disks from any piece of scrap metal.

Lay the metal pieces on a block of soft wood and punch holes where indicated; five in each disk; five in the fan; five in the fin. A nail or a prick punch will readily make these holes. The hole in the center of the fan and in the center of the $1\frac{1}{2}''$ disks are to be made large enough for a No. 7 screw; all other holes must be made small for No. 20 wire nails and No. 5 paper fasteners.

At the center of one end of the 10″ stick and at the center of one end of the 36″ stick, bore gimlet holes $\frac{5}{8}''$ deep for No. 7 screws. Through the 10″ stick bore a gimlet hole 2″ from the end where the first hole was made. Bore gimlet holes through the 36″ stick 1″ and 4″ from one end. These holes are for nailing or screwing the wind wheel to a post, railing or gable end of a building.

To Assemble the Wind Wheel: Reinforce the center of the fan with a $1\frac{1}{4}''$ disk on each side. Use four No. 5 paper fasteners in holes punched in the metal. Nail the fin to the 10″ stick, $2\frac{1}{2}''$ from the end having the gimlet hole, use $\frac{3}{4}''$ No. 20 nails. Slip a 1″ screw through a No. 6 iron burr, through the center of the reinforced fan, through a second burr and turn the screw into the hole in the end of the 10″ stick. Slip a $1\frac{3}{4}''$ screw through a burr, through the hole in the $\frac{1}{2}''$ stick, through a second burr and turn the screw into the gimlet hole bored in the end of the 36″ stick. Allow enough play so that the fan and fin stick will revolve freely on the screws.

Paint the wind wheel using black and one brilliant color of oil paint. When the paint is thoroughly dry, slightly roll the fan sections to make them catch the wind more readily.

Painting and Decoration as a Trade. The Association of Master House Painters and Decorators of the United States and Canada has just issued a pamphlet on the opportunities offered in painting and decorating as a trade. The pamphlet has been prepared by Mr. A. T. McGhan and takes up in detail, in language which boys can understand, the value of a trade as an occupation, the elements to be considered in the selection of a trade and the opportunities of the painting and decorating trade. The economic importance of painting and decorating, the lines of work open in the special branches of the trade are carefully discussed. The suggestion is made that there are large opportunities for becoming master painters. The art side of the trade is described as giving peculiar and personal satisfaction, as well as being of considerable financial value.

The booklet is fully illustrated and will be sent without cost to school authorities who desire copies for their personal use or for general distribution for prospective students in their painting departments. Inquiries may be addressed to the International Association of Master House Painters and Decorators, Washington, D. C.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for subscribers who have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from competent authorities. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis.

Moisture Proof Glue for Cabinet Work.

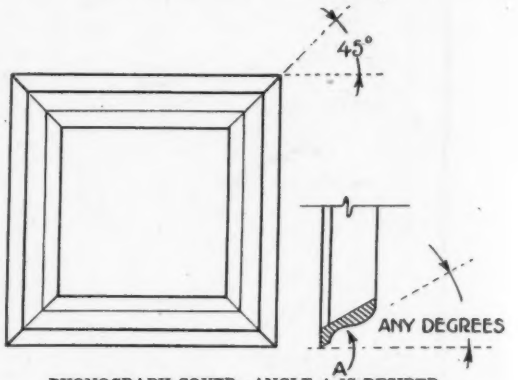
218. Q:—Please inform me as to the best way to make glue harden that is moistureproof. There is so much humidity in the air down here, that glue articles will not stay "stuck." I have been told that bichromate of potash, put in glue at time of gluing, is the right material. Are there other ways of waterproofing glue?—H. D. M.

A:—Soak up 55 oz. of Peter Cooper's cabinet makers' glue in twice its bulk of cold water until the glue shall have become soft but still retains its original shape. Pour off the excess water and bring to the temperature of boiling water in some form of double cooker. Avoid the use of dry heat or direct contact with the flame and glue pot. When entirely melted add 40 oz. of potassium dichromate which has been melted in a little boiling water and as soon as this has become dissolved or absorbed by the glue add 5 oz. of alum. I have used this on cypress for boat work and deck work and find it very satisfactory.

Another formula which I sometimes use consists in the addition of 1 part of raw linseed oil to 8 parts of hot glue stock, cooking for one-half hour with frequent stirring with addition of one-half ounce of nitric acid, dilute, per pound of dry glue used. This will prevent the souring or fermentation of the glue by mold.—Ralph G. Waring.

Cutting Angles.

221. Q:—In constructing phonograph cases I have had considerable trouble cutting the angle of the above drawing. If you can give any information concerning the cutting of this angle placed at any degree between vertical and horizontal, I will greatly appreciate the help.



PHONOGRAPH COVER—ANGLE A IS DESIRED.

A:—The accompanying drawings illustrate the method of solving this problem. No. 1 is the practical method adapted to shop use. No. 2 is a crude mathematical method for solving the angle.—George Ellison.

Large Exhibit Held. The largest exhibit of the manual training department at Clarksville, Tenn., was that held this year. Over two hundred different pieces were shown, ranging from footstools and taborets to buffets, cabinets, library tables, tea wagons and chifforobes. Two thousand feet of lumber was used at a cost of between $400 and $500. The total value of the exhibit is placed at $1,800 to $2,000.

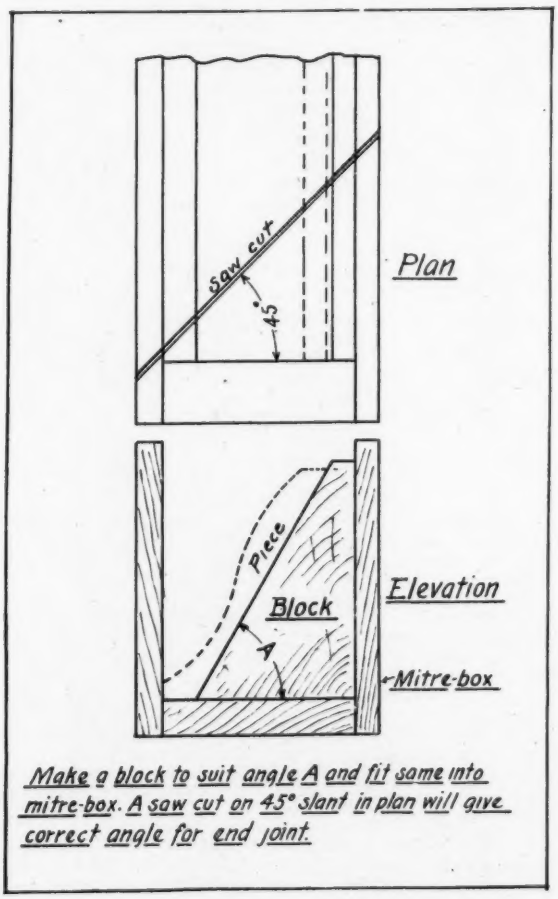

Saw cut
45°
Plan
Piece
Block
A
Elevation
Mitre-box
Make a block to suit angle A and fit same into mitre-box. A saw cut on 45° slant in plan will give correct angle for end joint.

FIG. 1. PRACTICAL METHOD OF CUTTING ANGLE.

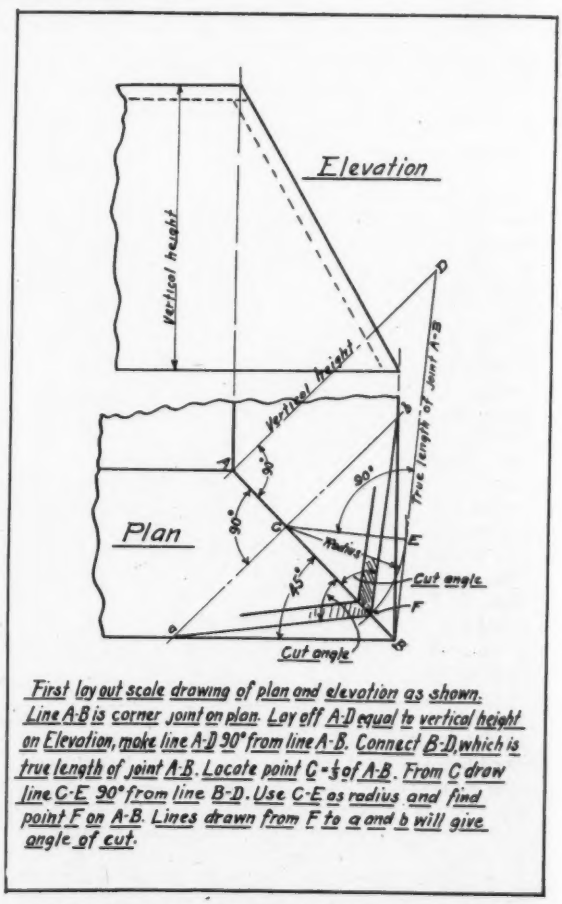

Elevation
Vertical height
Vertical height
True length of joint A-B
Plan
90°
90°
90°
45°
Cut angle
Cut angle
First lay out scale drawing of plan and elevation as shown. Line A-B is corner joint on plan. Lay off A-D equal to vertical height on Elevation, make line A-D 90° from line A-B. Connect B-D which is true length of joint A-B. Locate point C = ½ of A-B. From C draw line C-E 90° from line B-D. Use C-E as radius and find point F on A-B. Lines drawn from F to a and b will give angle of cut.

FIG. 2. MATHEMATICAL METHOD OF FINDING ANGLE WITH STEEL SQUARE.

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CONFERENCE RESULTS IN FORMATION OF NATIONAL HOROLOGICAL INSTITUTE.

Readers of THE INDUSTRIAL ARTS MAGAZINE, who will recall an article in our February Number under the title "America Must Have More Watchmakers, Jewelers and Engravers," will be interested to know that at a conference held in Washington, D. C., on May 19th and 20th, plans were formulated for the establishment of a National Horological Institute.

The conference was attended by representatives of many prominent horological and technical schools where the art of watchmaking is taught, as well as the representatives of leading watch manufacturing companies and scientific instrument makers.

The meeting attracted a great deal of attention in the jewelry trade because of the scarcity of watchmakers and jewelry artisans that has become a serious national problem. It is estimated that 4,500 men are needed now, and schools are unable to prepare men rapidly enough to fill the many vacant positions.

The conference was called under the auspices of the National Research Council cooperating with the Smithsonion Institution, and according to the plan which was adopted, the National Horological Institute will probably issue certificates to those who qualify properly in horological (watchmaking) branches. Certificates issued by this national body will indicate that their possessors are thoroughly qualified in their art and will result in giving proper dignity to it. This means that men who work in the precious metals and fashion beautiful jewelry and ornaments, and who are qualified to adjust the intricate mechanism of watches and other time recording devices and scientific instruments, will be graded according to their skill, and receive due recognition of ability, thus making the vocation more attractive as well as helping to stabilize the basis of remuneration.

A second conference is scheduled for October, when more definite plans regarding the formation and operation of the National Horological Institute will be adopted.

NEWS AND NOTES.

Industrial Rehabilitation. The State Board of Vocational Education of Iowa has completed plans for the operation of the new industrial rehabilitation law. Under the law, each case is to be treated individually, taking into consideration previous education and training. The training is to be given in the home community and the support of the individual while in training is to be taken care of through churches, lodges, and public-spirited citizens.

Hold Exhibit of Work. The students of the Newman Manual Training School, at New Orleans, La., recently held an exhibit of their work which comprised porch swings, smoking stands, miniature zoo, batik work, coat hangers and shoe trees and enameled permodello pendants. The pupils sold the cake, candy and fruits which had been prepared for the occasion. The work of 600 boys and girls went into the preparation of the exhibit.

Extend Vocational Guidance. The New England Vocational Guidance Association has completed the first year of its work. During this period it has built up a strong organization of progressive teachers, social workers, business people, etc., and has extended the work of vocational guidance throughout New England. The association which has its office in Boston, is headed by Mr. Frederick J. Allen, who acts as president.

School Training for Trades Valuable. Mr. Edward M. Waldron, former president of the board of education at Newark, N. J., in speaking recently before the Building Trades Employers' Association, criticized teachers for boasting of the number of students who go to college, rather than of those who take up training for the trades. He pointed out that the building trades must rely on the vocational and trade schools for the future mechanics, and that they should place less dependence upon workers from foreign shores. The apprentices in the school, said Mr. Waldron, must be trained to take the places of those who retire. In establishing the schools, three definite things are accomplished, (1) the boy is helped by getting a right start in life, (2) a community need is supplied in training boys to take care of building and machinery, (3) and the training given permits them to assume the work in the future.

Ask Double Amount for Vocational Work. The vocational schools of Pueblo, Colo., have asked for an appropriation of $8,000 for next year. Last year $4,000 was used in offering training in two evening high schools.

Back to the "Grind" Before Long

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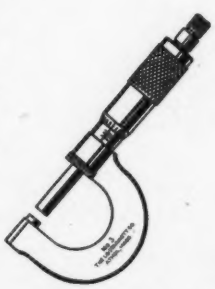

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Offer New Courses. The industrial department at Elkhart, Ind., has announced three new courses for next year, embracing machine shop practice, mechanical drawing and woodwork, and cabinet making.

Vocational Conference. The third annual Nebraska Conference on Vocational Education opened on June 6th for a one-week session at the Nebraska College of Agriculture. The week's activities were divided into three main groups, namely, agriculture, trade and commerce, and several national authorities addressed the conference on various phases of the vocational work. The sectional meetings which were held at the State Farm, were in charge of Mr. C. W. Watson, supervisor of agriculture, and Miss Alice M. Loomis, supervisor of home economics. Prof. L. M. Roehl of the New York State College of Agriculture, had charge of the farm shop program of the week and Mr. A. L. Burham, normal training inspector for the state of Nebraska, spoke on the technique of instruction.

Offers Scholarships. Twenty-five scholarships, with a value of $1,000 each, have been offered by the state of New York for applicants for positions in the vocational schools as industrial teachers. Qualified men in the trades and technically trained men are eligible, and those accepted are to spend one year at the Buffalo Normal School preparing to teach the subjects. Life certificates to teach specified trades will be given to applicants at the completion of the course, the annual salaries ranging from $1,800 to $3,500.

Offers Technical Course. Beginning with September, the Akron, O., high school will offer a technical course, which will major mechanical drawing, shop, plane and solid geometry, and algebra. The course is intended for boys who care to do handwork and shopwork and leads through a careful choice of electives to higher courses in the technical schools.

Complete Teacher-Training Course. A class of 34 men was graduated recently from the teacher-training and professional courses for teachers at the State Trade School, New Britain, Conn. The courses are part of a movement of the Federal Board of Vocational Education for providing normal school men for teaching positions, and the work is supported partly by federal appropriations and partly by state aid. The total number which have been certificated in the state reached 189 men.

Vocational Government School. A university for disabled army veterans has been established at Silver Spring, Md. The school which is to be one of a chain of such institutions, occupies a site of 35 acres and accommodates several hundred students. The course of instruction embraces automobile engineering, horticulture, dairying, and other special courses adapted for outdoor life.

Graduate Mechanics. Diplomas and certificates were presented to 44 graduates of the Ohio Mechanics Institute, Cincinnati, on June 7th. The commencement marked the graduation of the first classes in the two-year intensive day courses in industrial engineering, and the first classes which came from the Federal Board.

Exhibit of Furniture. The seventh and eighth-grade pupils of Decatur, Ill., early in June held an exhibit of furniture made in the manual training classes. The exhibit comprised several articles such as chairs, taborets, piano stools, magazine and umbrella stands, and settees. An exhibit of mechanical drawing and blue prints was also a part of the display.

New York, N. Y. The board has amended the bylaws to make eligible for assignment for teachers of non-vocational subjects in the vocational or trade schools, teachers above the sixth grade in grades other than the elementary course.

Exhibit of Art Work. An exhibit of art work of the high schools at Seattle, Wash., was held in the Fine Arts Galleries during the early part of May. The aim of the exhibit was to indicate the subject matter of the high school courses and the adaptation of art appreciation and art principles to commercial products. The exhibit was a success in that it gave inspiration and helpful suggestions to both new and experienced teachers.

Domestic Art Exhibit. The domestic art department of the New London (Conn.) vocational high school held an interesting exhibit on June 9th. The exhibit brought together a remarkable collection of handicraft made by the girls of the school. Among the articles on display were millinery, afternoon gowns, white organdie dresses, winter coats and wraps.

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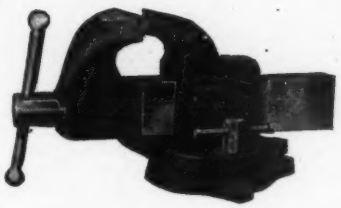

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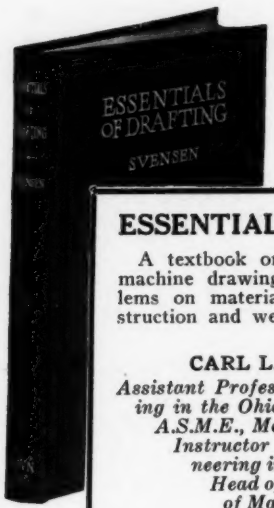

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Indus. A.-7-21.

Open Trade Training Centers. Instruction centers for the teaching of trades have been opened in Dallas, El Paso, Fort Worth, Galveston, Houston, San Antonio and Wichita Falls, Tex. Among the women's trades to be taught are power machine operating, dressmaking, designing, store teaching, millinery, bookbinding, home economics teaching, baking, cafeteria managing, cooking, salesmanship, waitress work, telephone training, cabinet making, tailoring, laundry sewing, and art needlework. For men, instruction will be given in millwrighting, blacksmithing, plumbing, pattern making, electricity, painting, woodworking, automobile mechanics, machine shop practice, sheet metal work, bookbinding, tailoring, foremanship, drafting and chemistry.

Approve Vocational Budget. Over the protest of three members, the school board of Cincinnati, O., has approved the 1922 budget which includes $64,964 for vocational training. Objection was made to the expense and to the fact that the work was not concentrated in the interest of economy.

Commencement Exercises. The Essex County (N. J.) Vocational School held its first commencement exercises at West Orange, with the graduation of thirty students from the institution.

Outline Plans for Vocational Training. Plans for the enlargement of the vocational department in two high schools at Riverside, Calif., have been made. The courses offered will be printing, machine shop practice, automobile and tractor repair, agriculture, carpentry and home economics.

Establish Government Vocational School. The Curtin building, at Helena, Mont., has been selected as the probable home of the new vocational school for service veterans, which the federal government will establish.

Vocational High Students Graduate. Nine students of the Fort Wayne, Ind., vocational high school received diplomas on June 15th, at the graduation exercises held in the high school auditorium. The courses completed by the graduating students comprised automobile work, home economics, machine shop practice and electricity.

Handicraft in the Schools. Handicrafts in the schools of Oakland, Calif., are not a decoration to the general courses, but are courses offered to earnest students who find in the prosecution of some of the mechanical or handcraft occupations, their particular channels of service and interest in life.

Besides teaching the technical ability to accomplish certain handcraft processes, the training offered in these courses teaches business and industrial organization, which is the most important lesson which some of the young people take away from the experience.

Thru cooperation between departments, and a real knowledge of how and why each step in a project is undertaken, the basis for real information on efficiency and management is furnished. This is well demonstrated in the work in the design and decoration class at the Lakeview School.

At Elmhurst School some beautiful rug weaving has been accomplished. Students set up intricate patterns on large and small looms.

Printing is surely "no joke" but a serious and enthusiastic occupation in the printshop at the Vocational High School. In addition to the equipment in this school, there are found more or less complete equipments in four of the elementary schools.

Interesting Exhibit. The boys of the manual training department at Galveston, Tex., held an interesting exhibit of their work on June 9th. Articles made in class were shown in the shops of the Ball and Central High Schools, Goliad and San Jacinto Schools. With the addition of automobile mechanics, the department offers a four-year course in woodwork, metal work and automobile mechanics to boys. Among the articles displayed were library tables, lamps, chests, chairs, porch furniture and bird cages.

To Open Vocational Schools. Plans have been discussed at San Francisco, Calif., for the opening of a number of vocational schools in San Francisco and the Bay Cities.

High School Exhibit. The students of the manual training department, at Brainerd, Minn., held an exhibit of their work. Among the articles displayed were library tables, phonograph cabinets, pedestals, taborets and cedar chests. The work of the grade schools was represented by a number of small pieces of woodwork.

"Applied Art."

By Pedro J. Lemos. Half cloth. 380 pages of illustrations and text, with 35 additional pages of colored plates. Pacific Press Publishing Association, Mountain View, California.

This book presents a great quantity and variety of suggestions and illustrations that should be most helpful to the teacher of Art in the public schools. The illustrations and text are so clear and explicit that the teacher and pupil should be able to carry out the projects with little difficulty.

The author of this fine book is editor of the School Arts Magazine, and director of the Stanford Museum of Fine Arts. Experienced in school instruction, as well as in a variety of art production, Mr. Lemos has been able to put into one compact volume, a work of the greatest variety and importance for school instruction.

The text covers eight years of grammar grade and technical subjects for the academic grades. Drawing and painting, design, color, handicrafts, lettering and illustration are presented in successive chapters. The handicrafts described and illustrated are stenciling, block-painting, batik, tooled leather, gesso, metal and cement work. Lesson outlines for the grammar and the academic grades are given in the last two chapters.

Pattern Making.

By E. M. McCracken and Charles H. Sampson. Cloth, 8 by 11 inches, 112 pages. D. Van Nostrand Co., New York, N. Y.

This book is intended to be used as a students' text and reference book. The first part presents formal definitions and descriptions of types of patterns, general methods used by pattern makers, pattern details, hand tools, machinery; molding tools, devices, materials and methods; and foundry equipment and practice. The second part of the book is made up of a series of 24 carefully graded exercises and six additional patterns. Each of the patterns is of a standard commercial machine part.

All of the work suggested is within the ability of young students and can be done in an average school shop.

The book is fully illustrated and well printed.

PUBLICATIONS.

Schooling for Vocations. A circular of information issued by the Vocational School, Atlantic City, N. J. The nature of the work offered in the boys' vocational school is well presented in this bulletin, and the contents of the same should appeal to a large number of boys in elementary schools. The preparation and printing of the booklet is the graduation project of one of the third-year students in the school. The completed project is considered exceptional in view of the fact that halftone work under actual trade or shop conditions calls for a great amount of skill by the workman.

The Printing Teacher. April-May, 1921. Issued by the National Association of Printing Teachers. Geo. P. Berry, President. This paper aims to promote a professional spirit among the printing teachers, to offer a clearing house for the interchange of ideas, to develop a spirit of mutual understanding, to stimulate constructive thinking among teachers of printing and their friends, and to outline helpful projects which will make printing interesting as well as valuable in the modern school curriculum.

Farm Home Conveniences. Madge J. Reese. Farmers' Bulletin 927, 1918, U. S. Department of Agriculture, Washington, D. C. Home demonstration work in several thousand country homes, under the direction of demonstration agents, has not only effected a saving in the work of the home, but has helped the farm woman to get a greater amount of happiness out of her daily tasks. The conveniences described in the pamphlet have been selected because they may be made at a moderate cost by anyone who has simple tools and the ability to use them. Valuable suggestions have been included from state publications and from the experiences of state and county home demonstration agents.

Homemaking in the Grades and High School. Compiled by Helen Goodspeed, State Department of Public Instruction, Madison, Wis. An outline for teaching sewing and clothing, cooking and food, and household management in the grades and high school. The inclusion of a section on sex hygiene seems unscientific and unnecessary.

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S.W.

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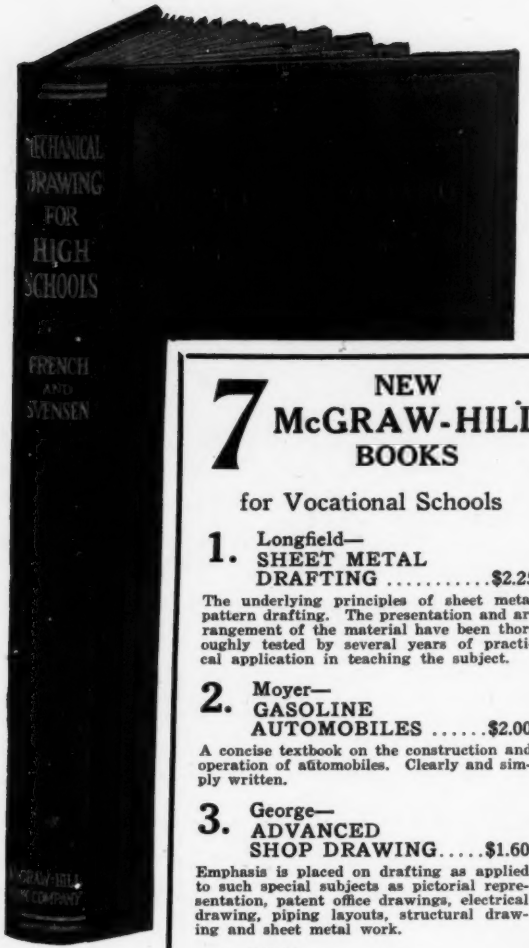

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Practical Work. The boys and girls of Public School 8, Brooklyn, N. Y., early in June, undertook the work of decorating the rooms of the Home for Friendless. The work was assigned to different groups of children, one class decorating the children's home, one the tables and chairs, one the hanging of curtains made by the pupils, and one made over the fireplace so that it can be put to use. About forty children from the home attend the school, a fact which gave added inspiration to the work which the children performed. The work was intended to put the shopwork and drawing and sewing to practical use and was originated and carried out by Miss Mary Walsemann, principal of the school.

Art Museum Exhibits Work. The Metropolitan Museum of Art, New York City, recently added gifts consisting of metal work, needlework, jewelry design, book and silver. The metal work embraced grates, andirons, knockers, door hardware, fan and sidelights and mantels; the needlework consisted of seventeenth century tassel work, while the silver was limited to a coffee pot by Ephriam Brasher and presented by Judge Clearwater.

Art Display. An art exhibit from five public schools of Akron, O., occupied the mezzanine floor of the Akron Public Library from May 9 to 14. The work which was all done by the children in these schools, was under the supervision of Miss Jessie Muir, assistant art supervisor.

Style Show. The girls of the sewing classes in the North High School, Akron, O., during the early part of May, took part in a style show. At the show, twelve girls appeared in dresses made in class. Two of the best ones were a lavender gingham and a rose dotted swiss, combined with organdie. The girls taking part represented each of the four high school classes, with the seniors predominating.

Elect New Officers. The School Crafts Club of New York City, which held its annual meeting in April last, has elected the following officers for the year 1921-22: President, Mr. M. J. Corcoran, Elizabeth, N. J.; Vice-President, Mr. P. M. Wagner, Newark, N. J.; Secretary, Mr. F. C. Arnold, New York, and Treasurer, Mr. E. F. Judd, Montclair, N. J.

Commends Intensive Plan. Mr. Frank Hanson, Principal of the Burnet School, Newark, N. J., who spoke recently before the teachers of Cincinnati in the Hughes High School, discussed the Intensive Plan in Elementary Schools Cooperating with the Departmental Plan. Mr. Hanson gave the results of his experience with such a program during the past three years as principal of a school of fourteen hundred students. Under the plan, the year is divided into cycles and daily lessons are conducted in these cycles for a period of about five weeks, instead of weekly lessons throughout the term. Mr. Hanson in commending the plan, declared that a great deal more has been accomplished than under the old system. By means of daily lessons, it is pointed out, there is less need of review and teachers are required to care for only one-fourth as many different students each week, as under the old system, enabling them to become better acquainted with the individual pupils.

Following the teachers' meeting, the special departments gathered in the school dining room for a dinner arranged for the Industrial Arts Club, with Mr. Hanson as guest of honor. Supt. Condon who spoke to the teachers, reaffirmed his appreciation of the newer forms of education represented by the departments and congratulated the instructors for coming together in a common meeting. At the close of the addresses, Mr. Hanson answered questions put to him by the teachers and was successful in overcoming many objections in the minds of his hearers. As a result of the meeting, one of the principals of a large Cincinnati school has requested that he be permitted to reorganize his school along the lines which have been followed by Mr. Hanson in Newark.

Fifty Graduated. A class of fifty students was graduated on June 9th from the Barrett Manual Training High School at Henderson, Ky. Lawrence Baldwin, president of the graduating class, made the class speech and Principal Mark Godman of the school, presented the diplomas.

Smith-Hughes Law Operating. Vice-Chairman James P. Munroe of the Federal Board of Vocational Education, speaking recently on "Vocational Education of Today" declared that the Smith-Hughes law has been accepted by more than half of the states and is in process of being adopted by the remaining states. Where four years ago, only a few states provided adequate training for vocational teachers, now practically every state has an efficient training system.

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CHECK FOR MECHANICAL DRAWING.

Mr. Daniel Darney, director of manual arts, Leominster, Mass., has devised a plan for checking up the work in mechanical drawing. The form which has been prepared for the purpose, takes care of everything necessary in drawing work and is helpful in calling attention to poor drawing, incorrect or incomplete plates. The form is as follows:

LEOMINSTER PUBLIC SCHOOLS.
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Name Grade Plate Date

The attached plate has been inspected and is herewith returned with the suggestion that the following checked points be carefully noted and improved upon in your next work.

Accuracy Neatness Measurements Speed

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Full Construction Dotted Dot and dash
Dimensions Arrow heads Figures Points
Inch marks Straight Curved Broken lines
Frame (Heavier Lighter) Points numbered or lettered
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LETTERING

Name Plate number Class Date Other lettering

VIEWS

Insufficient Incorrectly placed Incorrectly drawn

(Complete and hand in, with this slip attached, any plate returned with any of the items under VIEWS checked.)

RE-DRAW THIS PLATE

A plate returned with the above checked should be re-drawn and handed in with the next week's work to receive a mark. All incomplete or re-drawn plates not in as stated will be marked 0, unless a written excuse from your home is received when the work is due.

Attach this slip to the re-drawn or incomplete plate before handing it in.

REMARKS

The work on the attached plate is Excellent Very Good Good Fair Poor Very Poor

DANIEL DARNEY,

PERSONAL NEWS.

Miss Edith Campbell has been appointed Director of the Vocation Bureau at Cincinnati, O., to succeed Mrs. Helen T. Woolley, resigned. Miss Mabel R. E. Fernald has been appointed as assistant director. Miss Campbell will act as the executive head of the bureau and Miss Fernald will undertake the scientific work.

Mr. George Loewy has been appointed Director of Vocational Activities for New York City schools. Mr. Loewy served with distinction during a special probationary period.

Mr. Charles H. Winslow has recently been appointed Secretary of the Pennsylvania Museum and School of Industrial Art at Philadelphia, succeeding Leslie Miller, resigned. Mr. Winslow acquired wide experience in all matters pertaining to industrial and vocational training. He was a member of the commission on federal aid to vocational education under the Wilson administration, and was employed by the United States Bureau of Labor Statistics to make a study of institutions giving vocational education. He was also assigned by the same bureau to make a study of conciliation and arbitration in the building trades.

Mr. Winslow became a member of the Massachusetts Commission on Industrial Education in 1906, giving considerable time to the supervision of projects in vocational education and to writing on that subject for the several periodicals interested in vocational education. He was asked by the federal board of labor to prepare a special report on the attitude of the American Federation of Labor toward industrial education.

Miss Lola M. Champlin of Tahlequah, Okla., has been appointed head of the state board of vocational training, succeeding Cora Smith.

Mr. William Kerr has been appointed supervisor of agriculture at Boise, Ida., succeeding George E. Denman.

The Workmaster, printed in the Agassiz Prevocational School, Jamaica Plain, Boston, has recently received a congratulatory letter from President Harding. The boys who prepared the magazine, set the type and printed it, are especially proud of the President's letter because of his work as an editor and newspaper publisher.

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Add New Subjects. Manual training and domestic science have been added to the first and second years of the general and commercial high school courses. The courses are intended to provide practical work for those students who do not expect to enter college.

Classes for Soldiers. The school board of Boston has established classes for disabled soldiers, sailors and marines in the local trade school. The classes which will be conducted for a period of six weeks, will be under the direction of the Federal Board. A director, headmaster and eight other teachers have charge of the work.

Mrs. Frank I. Pearce, 74, founder of the first free manual training school in the United States, died in Chicago, on June 23rd. The Union Training School for Boys, which Mrs. Pearce established in 1886, owed its origin to the needs of five friendless boys whom Mrs. Pearce took under her protection. This class later grew to thirty students and five teachers. When the school was incorporated three years later, it had an enrollment of 192 boys and employed eighteen teachers. When failing health caused Mrs. Pearce to give up the work, the tools and equipment were turned over to the Illinois Industrial School.

Miss Frances Kirkpatrick of Richmond, Mo., has accepted a position as instructor in home economics at Maywood, Ill.

Mr. Ned Replogle has been appointed in charge of industrial and vocational work at the Boys' Industrial Home, Oakdale, Pa.

Mr. A. C. Newell, Director o' the Manual Arts Department at the Illinois State Norma. University, has accepted a lectureship in the Manual Arts at the State University of Iowa for the summer session.

Enlarge Vocational Training. Plans for enlarging the vocational training centers at Pittsburgh, Pa., have been completed. The enlargement will reach an estimated cost of $50,000.

Army Bill Fails. An effort recently made to increase the educational appropriation in the army bill to provide better instruction for service men in the field of vocational training has failed. Critics of the proposal declared that the country needs a fighting army

Supports Manual Training Department. The manual training department of the city of Greenville, S. C., held during the month of May an exhibit of products of the wood shops in the show windows of three of the most prominent business firms. The exhibit attracted considerable attention. Public interest in the exhibit was greatly enlarged during the week of the display by a discussion of the value of manual training in the education of the boy, prepared by Mr. R. S. Huntington, president of a prominent electrical contracting corporation of the city. This discussion was printed in the local newspapers and was reproduced in the shape of a pamphlet mailed to all of the business men and prominent citizens of the city.

It took up from the standpoint of a businessman and citizen the fundamental value of school shopwork, from the standpoint of general education and vocation.

The display received additional attention in the local papers in the shape of a very complete descriptive article which appeared in the Sunday editions.

Greenville is actively promoting shopwork in the homes through the Rotary Club.

Offer New Cutter. The North Bros. Mfg. Company have recently announced a new cutter designed especially for quick and easy cutting of belting and brake lining. The cutter is designed to handle materials to six inches wide and ⅝ inch thick and will not cut metal.

The tool operates through rack and pinion movement operated by a lever. The knives are especially beveled to insure durability, a clean cut and ease in operation. Adjustment is provided for wear and regrinding. Circulars are available.

Offer Valuable Historic Pamphlet. The Greenfield Tap and Die Corporation recently issued a souvenir history of the development of the firm and is offering to send copies gratis, to school authorities for class and library use.

The pamphlet is of special interest to shop teachers for correlated study in that it traces the development of the Greenfield line of taps and dies and other screw-cutting instruments from very simple and crude tools to the present inclusive line of products.

Carnegie Technical Institute, Pittsburgh, has received a gift of $9,262,000 from the Carnegie Corporation. An additional grant of $8,200,000 has been made on condition that the Institute raise from outside sources the sum of $4,200,000. With these gifts the Institute will have received a total of $49,317,482.

The New York Chapter of the National Association of Corporation Training recently began a series of conferences with authorities of the public school system on the subject of vacation employment. The discussions which were initiated by Dr. Leonard F. Fuld, educational director of the bond department of Henry L. Doherty & Company, were devoted to the problems of the employment of schoolboys and girls during the summer vacation.

It is especially desired that members of other business concerns shall enter this field of cooperation with the schools. Many business houses have appreciated the work of the Newtown High School, the Washington Irving High School, the High School of Commerce, the Bay Ridge High School and the Haaren Cooperative High School, which have sought to coordinate themselves with the world of business.

An urgent request has been made for more publicity to secure the cooperation of the businessmen in order that the school authorities may be able to realize their plans and ambitions. Cooperation between the schools and the employers has been a large factor in solving the lifework of the children and men like Dr. Fuld and organizations like the Chamber of Commerce have been strong factors in this direction.

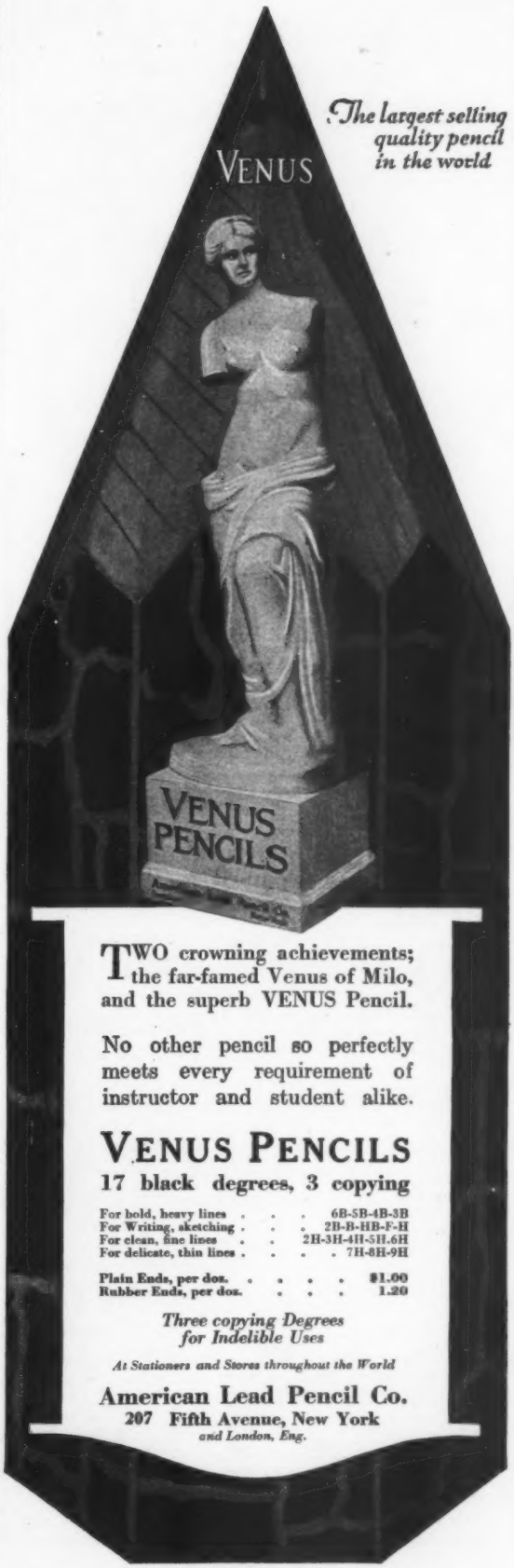
Paper Makers to Train Employes. The training of employes for promotion will be actively undertaken at an early date by the paper industry of the United States and Canada. The work is already under way in the Fox River Valley as a part of the paper mill welfare work done by the Wisconsin Paper Manufacturers. The American Paper and Pulp Association has spent three years in preparing for this kind of work which is to be introduced in all paper mills. The sum of $30,000 has been expended for the preparation of textbooks and of a series of five projected books, two are now ready for use. The three additional volumes will be completed before the students now enrolled in the course have completed the first two of the group.

At a recent convention of the Association a detailed survey of the industry was presented, outlining plans of promotions which are possible to workers. The survey report suggested information which can be given to workers, to show them along what lines they may be advanced and in what way preparation will make promotions more rapid. The survey was prepared by Mr. J. G. Wright of the Federal Board for Vocational Education. The survey revealed according to Mr. Wright that a large number of occupations are regarded as relatively low in skill but that opportunities do exist for the promotion of better workers to jobs of greater responsibilities.

Another year of sewing and another of cooking were added to the curriculum of the high school in Butler District, Hancock County, W. Va. Miss Margaret Workman of West Virginia Wesleyan College was employed for this work at $1450 a year. Supervision of music was added to the grade and high school curriculum and Miss Evelyn L. Ross of Columbus, Ohio, was elected as supervisor at a salary of $1500 a year.

Manual training was added to the high school curriculum of Butler District, Hancock County, W. Va., and Prof. R. L. Gates of Indiana University was elected as instructor at a salary of $1,800 a year.

Advocates Industrial Training for Women and Girls. Vocational training for women and girls in machine shops where light parts are made, in wood product factories where assembling and finishing are done, in optical and instrument factories, and in sheet metal shops has been urged by Miss Mary Anderson, Director of the Women's Bureau of the U. S. Department of Labor. Miss Anderson shows that while women are employed in these trades in a number of states, few of the vocational training facilities for such occupations are being used by women. She predicts that women wage-earners in the industries will increase because of demonstrated capability in the past, the decrease of male immigrant labor and the growing demands of expanding industries.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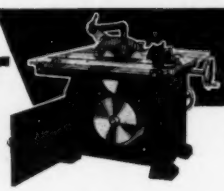

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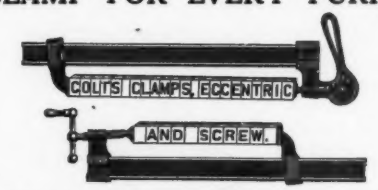

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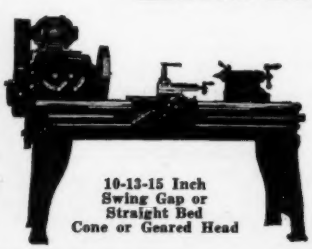

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PUBLICATIONS RECEIVED.

Mt. Hope School Journal. Printed by the classes in typography of school No. 28, The Bronx, New York City. Contains forty pages of prose and poetry, with illustrations of linoleum printing.

Planning the Farmstead. M. C. Betts and W. R. Humphries, Farmers' Bulletin 1132, Bureau of Public Roads, Division of Rural Engineering, U. S. Department of Agriculture, Washington. The object of the bulletin is to set forth general principles involved in planning the arrangement of the buildings of a farmstead in their relation to one another. The pamphlet discusses the site, elevation and drainage, water supply, nature of soil.

Project Study Outlines. Prepared by J. F. Bolton, W. M. Gourley, Norris A. Mayo, D. B. Osburn, R. A. Rix, A. H. Wilcox, J. N. Singletary, George H. Wilcox, Paul W. Chapman, C. L. Davis, J. A. Barton, F. S. Russell, and James W. Teitrick. Bulletin 121, 1920, issued by the State Board of Vocational Education, Austin, Tex. The present material has been prepared in most cases by teachers of vocational agriculture in Texas, and some by teachers and supervisors in other states. It has been issued in recognition of the need of teachers for a means of directing the activities of the pupils, and also as a means whereby the pupil may anticipate the problems he will meet in carrying out his project. It aims, therefore, to settle the problem of how much direction the pupil should have, and how this direction may best be given. Among the subjects taken up are corn, cotton, potatoes, wheat, hogs, milk production, baby beef production, sheep production, egg and poultry production.

Statement of Policies of the Vocational Board of Arizona. Dr. R. H. H. Blome, Director, Phoenix, Ariz.

Illustrated Mathematical Talks by Pupils of the Lincoln School of Teachers College, New York City. The material illustrates, to some extent, the two things the school is trying to do, First, to construct a liberal curriculum, and second, to improve the material and the practices by experimental efforts pushed vigorously with regard to the welfare of the pupils. The material takes up graphical representation, fundamental principles in construction of graphs, graphical solution of problems, motivation in geometry, surveying, logarithms, slide rule, trigonometrical problems.

Housecleaning Made Easy. By Sarah MacLeod. Bulletin 1180, U. S. Department of Agriculture, Washington. The bulletin discusses the problems of how to make housecleaning simpler and easier, and at the same time to get the full service from the materials used in the furnishing and care of the house. Among the topics discussed are implements and materials for cleaning, care of cleaning implements, methods of cleaning, general directions for cleaning, and prevention of household pests.

Camp Pike College, Camp Pike, Ark. The pamphlet is the latest catalog of the army vocational school at Camp Pike, which gives an accurate insight into the work being accomplished. The school was established by the War Department a year and a half ago for the benefit of the soldiers in active service. The school work is in addition to the regular army duties and is offered as a vocational opportunity to the enlisted personnel. The subjects include printing, motor mechanics, pharmacy, typewriting, dramatic art, music, carpentry, animal husbandry, plumbing, sheet metal work, and motorcycle work.

The Problem of Summer Teaching in Connection with Project Supervision. Aretas W. Nolan. Circular No. 7, November, 1920, U. S. Bureau of Education. This paper contains valuable suggestions for teaching agriculture and affords a good illustration of the practical application of the vital principles of education for teachers of vocational agriculture and for teachers of other subjects.

Mr. Chas. B. White of Bristol, Pa., has taken charge of the print shop at the Camp Curtain Junior High School, Harrisburg, Pa.

Mr. David C. Fox has been engaged as instructor of the general industrial course in electricity, and Miss Anna F. Petty, as instructor in textiles and laundry work, at the Schwab Industrial School, Homestead, Pa.

Mr. H. A. Shepard, of Ely, Minn., has been selected as director of vocational education at Marion, O. The appointment is subject to state ratification.

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